SECOR
International Incorporated

ADDITIONAL SUBSURFACE INVESTIGATION

GRAND MARINA FACILITY
2099 Grand Street
Alameda, California

Submitted by
SECOR International Incorporated
90 New Montgomery Street, Suite 620
San Francisco, CA 94105

May 15, 1995

Prepared by:

Terri J. Plunkett-Kalmey, R.E.A.
Project Geologist

Reviewed by:

James G. Ritchie, R. G.
Principal Geologist

REGISTERED GEOLOGIST
JAMES G. RITCHIE
No. 4974
STATE OF CALIFORNIA

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

This Summary Report presents the findings of the Additional Subsurface Investigation conducted by SECOR International Incorporated (*SECOR*, formerly doing business as or dba SEACOR) at the Grand Marina Facility located northwest of the intersection of Grand Street and Fortmann Way, Alameda, California (the Site, shown on Figure 1). The Site is presently used as a marina with docking, repair and office facilities (Figure 2). An above ground tank (AGT) farm was formerly located in the central portion of the Site. The tanks have since been demolished, although the concrete-floored and -bermed containment structure for the AGT farm remains, along with various underground conveyance pipelines.

On March 30, 1993, the Alameda County Health Care Services Agency (ACHCS) requested that a Plan of Corrective Action be submitted for the former AGT farm area, including related pipelines. *SECOR* performed an investigation in response to this request; the investigation results were presented in our April 6, 1994 Summary Report. The ACHCS subsequently requested further assessment of the extent of petroleum-impacted soil and groundwater associated with the former AGT farm. *SECOR* prepared a Work Plan Addendum in response to this request and submitted the document to the ACHCS on October 11, 1994. *SECOR*'s Work Plan Addendum proposed the following activities:

- Installing, developing, and sampling four additional groundwater monitoring wells;
- Abandoning five existing groundwater monitoring wells;
- Conducting a tidal influence study;
- Conducting quarterly groundwater monitoring; and,
- Submitting a Summary Report.

The activities described in this Summary Report were implemented upon ACHCS approval of the Work Plan Addendum to further assess the source(s) and extent of petroleum hydrocarbon-affected soil and groundwater underlying specific areas of the Site. Three quarters of groundwater monitoring and reporting activities remain, and will be performed through September 1995.

2.0 SITE BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The Site is located within an irregularly-shaped parcel along the southern edge of Alameda Harbor in Alameda, California (see Figure 2). The parcel is approximately 1,300 feet from east to west and approximately 1,225 feet from north to south. The northern and eastern portions of the parcel are under water. The land portion was created through filling which took place in the late 19th and early 20th centuries. The Site is bounded to the south by Grand Street, to the west by Fortmann Way, to the north by the Marin Barge and Tug facility, and to the east by Fortmann Basin. The Site is currently used as a harbor for launching and berthing boats.

An Environmental Assessment performed by Harding Lawson Associates (HLA, 1987) for Encinal Marina and a Site history compiled by Bloomfield (1987) described the following Site history. An AGT farm was previously operated on-site and was used until 1989. According to documentation provided by Unocal, gasoline, diesel fuel, lube oil, aviation fuel, and slop oil/bilge water were previously stored by Unocal within the AGTs. The materials stored in the AGTs were conveyed to or from the AGT farm and the pier via underground pipelines. A 1,000-gallon underground storage tank (UST) used to store gasoline, formerly located approximately 300 feet south of the AGT farm, was removed in May 1988.

Other historic Site uses may have included the following:

1893-1940s: Alaska Packers Association operated a fleet of fishing vessels.

1906-1917: Taylor and Company operated a lumber yard.

1917-1983: The City of Alameda (the City) Corporation Yard used the facility for a variety of activities including auto repair, carpentry, blacksmith, and a dog pound.

1930-1952: Union Oil Company (Union) leased a portion of the Site from Harbor Tug and Barge (HTB) and used the Site for fuel storage as early as 1930. Union was responsible for constructing the AGT farm and stored gasoline, diesel fuel, fuel oil, kerosene, aviation fuel, and other petroleum compounds within the AGTs.

1953-1959: W. D. McElwain, dba Bay City Fuel Oil Company (BCFO) assumed the lease with the City of Alameda and operated the AGT farm as a bunker fuel depot.

1926-1989: Portions of the Site were reportedly leased by HTB.

1959-1989: HTB purchased, maintained, and operated the AGT farm.

1980-1986: Healy-Tibbets Construction Company used a portion of the Site for storage of marine construction equipment

1986-present: Grand Marina purchased the Site and operates a marina

2.2 SITE INVESTIGATION HISTORY

Previous Site investigations and activities were initiated by HLA during April 1987 which included installing six groundwater monitoring wells (W-1 through W-5, and B-7) and advancing six soil borings in the vicinity of the AGT farm (see Figure 2). HLA also dug six test trenches at various on-site locations during this investigation. In November 1987 approximately 285 tons of petroleum hydrocarbon-impacted soil were excavated to a maximum depth of five feet below ground surface (bgs) from the vicinity of the AGT farm. The soils were subsequently disposed of off-site. Free phase petroleum hydrocarbons were observed within the limits of the excavation. In May 1988, Uriah, Inc. removed a 1,000-gallon capacity gasoline UST and found soil adjacent to the UST to be impacted with petroleum hydrocarbons.

In June 1990, Versar, Inc. performed an environmental risk assessment at the Site. Versar collected water samples from the estuary, four groundwater monitoring wells, and the sump within the AGT farm area. Versar also collected soil samples from two areas of discolored soil and removed nine cubic yards of soil from the vicinity of the AGT farm.

In January 1992, Zaccor Corporation (Zaccor) conducted a Limited Environmental Site Assessment at the Site This assessment included removing the AGTs with the exception of the concrete foundation and the product lines. Zaccor advanced soil borings and collected soil samples from the vicinity of the AGT farm, the former 1,000-gallon UST, and the product lines. Zaccor also installed four additional groundwater monitoring wells (MW-1 through MW-4) and detected elevated concentrations of petroleum hydrocarbons, primarily diesel and oil and grease, in both soil and groundwater beneath the Site during this phase of the investigation. Historic soil sample locations are shown on Figure A1, and the data are tabulated on Table A1 within Appendix A.

In general, the Site investigations revealed the greatest hydrocarbon concentrations in soils at depths to two feet beneath the AGT farm floor and beneath the former pump house. Samples collected from depths of between three and seven feet beneath the AGT farm, the pump house, adjacent to the northern edge of the AGT farm, and in the vicinity of the former UST indicated elevated, but lower hydrocarbon concentrations. Groundwater samples collected from on-site monitoring wells in June 1992 revealed elevated gasoline, diesel, and benzene concentrations in well MW-2 near the former UST. Groundwater samples collected from wells W-1, W-2, W-3, and MW-4 indicated significantly lower concentrations of total petroleum hydrocarbons as gasoline (TPHg), as diesel (TPHd), and/or benzene.

In October 1993, *SECOR* conducted a Site Investigation composed of an historic records review, a pipeline integrity test, and a subsurface investigation. The pipeline integrity test results indicated that the three lines previously used to convey petroleum liquids and bilge/sludge to and from the former AGT farm are competent and have not leaked. The former AGT farm constructed in 1930 by Unocal stored and distributed various hydrocarbon compounds until approximately 1952. The contents stored in the AGTs, as reported by Unocal, included gasoline, fuel oil, diesel fuel, kerosene, ethyl, aviation fuel, stove oil, and an unknown solvent (S-76 solvent). Zaccor demolished the AGT's in 1992. Nearby leaking UST cases listed by the Regional Water Quality Control Board (RWQCB) include Encinal Marina (the Site), Alameda Fire Station (1705 Grand Street), Pennzoil (2015 Grand Street), and Weyerhauser (1801 Hibbard Street) Historic Site use appears to represent the most significant potential source of hydrocarbons identified in on-site soil and groundwater.

The Subsurface Investigation conducted by *SECOR* confirmed that fill composes the upper one to six feet of Site soils The fill is locally underlain by a fine-grained sand with varying amounts of gravel and clay, but is primarily underlain by the dark gray silty clay comprising Bay Mud The Bay Mud contains sandy

and peat-rich horizons. Samples collected from locations south of the AGT farm (TP3 with TPHd and TPHg at 800 and 13 milligrams per kilogram or mg/kg, respectively) and northeast of the pump house adjacent to the northern wall of the AGT farm (TPHd at 300 mg/kg, see Figure A2 and Table A2 in Appendix A) contained the greatest reported hydrocarbon concentrations. Samples collected from the northern portion of the area of investigation (HD1 with TPHd at 15 mg/kg), north of the pump house (TP1 with TPHd at 29 mg/kg), and near the joint in the diesel fuel pipeline north of the AGT farm (PL3 with TPHd at 5.0 mg/kg) contained lesser hydrocarbon concentrations. The vadose zone soils beneath and surrounding the AGT farm to a distance of approximately 40 feet contain concentrations of TPHg, TPHd, and oil and grease.

Groundwater grab samples collected immediately north and northeast of the AGT farm pump house contained elevated TPHd concentrations (see Figure A-3). The extent of impacted groundwater appeared to be limited to the vicinity of borings TP2 and TP2A, although a confirmatory sample collected southeast of boring TP2A was not obtained. In addition, pipeline-vicinity groundwater grab samples collected north of the AGT farm (PL2 and PL4) contained elevated TPHd concentrations. The borings surrounding PL4 yielded data which indicated the TPHd extent was limited; however, groundwater grab samples were not collected bayward of PL2, due to refusal met by the drilling rig. With the exception of low toluene, ethylbenzene, and xylenes concentrations reported in one water sample, gasoline-range hydrocarbons were not reported in groundwater samples analyzed for TPHg and benzene, toluene, ethylbenzene, and xylenes (BTEX) constituents.

2.3 GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

The Site lies within the East Bay Plain along the eastern margin of San Francisco Bay. Alameda and western Oakland are underlain by recent deposits including alluvium, the Merritt Sand and Bay Mud. The Merritt Sand is composed of fine-to medium-grained, well-sorted dune sand deposits. Lithologic information obtained from previously-advanced on-site soil borings and six test trenches indicate the Site is directly underlain by one to five feet of sandy material which is in turn underlain by native Bay Mud that extends to a depth of at least 15 feet bgs (Zaccor, 1992).

The encountered Bay Mud soils consist of unconsolidated dark gray to black clay and silty clay rich in organic material and interbedded peat. Locally, the Bay Mud contains lenses and stringers of silt and sand as well as peat. The Bay Mud has a low permeability and generally functions as a barrier to the vertical movement of salt water from San Francisco Bay into underlying sediments. The Bay Mud is typically saturated although the water is generally not considered potable because of the low Bay Mud permeability and high salinity of the contained water.

Zaccor encountered groundwater during drilling at depths of 2.5 to 3 feet bgs, primarily within the fill and fine sandy material overlying Bay Mud. Zaccor measured shallow groundwater in four on-site monitoring wells in June 1992 at depths of 2.18 to 4.14 feet. These data correspond to groundwater elevations ranging from 0.78 to 1.37 feet above mean sea level (msl). Zaccor (1992) reported that shallow groundwater underlying the Site flows towards the northwest under a gradient of 0.0065 feet per foot

3.0 FIELD INVESTIGATION

The Subsurface Investigation performed by *SECOR* consisted of five primary tasks: conducting preliminary field activities, installing additional groundwater monitoring wells, abandoning five existing groundwater monitoring wells, performing a tidal influence study, and quarterly monitoring of on-site wells. The methods followed in implementing these tasks and the task implementation results are described in the following Sections.

3.1 PRELIMINARY FIELD ACTIVITIES

Prior to conducting field work, *SECOR* prepared an Addendum to the existing Work Plan describing the proposed additional activities, revised the existing Site-specific health and safety plan (HASP), and obtained monitoring well permits from the Alameda County Flood Control and Water Conservation District (ACFCWCD, see Appendix B). Underground Service Alert (USA) and a professional utility locator cleared the boring locations with respect to underground utilities and other obstructions. *SECOR* then attempted to find existing buried or difficult to locate wells using ground penetrating radar. The ACHCS approved the Work Plan Addendum in October 1994, and *SECOR* conducted field activities beginning in October 1994 as part of the Work Plan Addendum implementation.

3.2 MONITORING WELL INSTALLATION

SECOR installed four additional wells to assess groundwater conditions between the former AGT farm and Alameda Harbor, as well as at an apparently upgradient on-site location. *SECOR* also advanced two additional borings which were subsequently abandoned. One of these borings was advanced as a result of abandoning the initial boring for MW-5. The second boring (TP-3A) was advanced in the area between well MW-2 and boring TP-3 to further characterize soils and first encountered groundwater in the area. The boring advancement, and well installation, development, sounding, and sampling procedures are described below.

3.2.1 Drilling and Soil Sampling

Bayland Drilling, Inc. (Bayland) of Menlo Park California advanced the borings and installed the monitoring wells on October 26 and 27, 1994, under the supervision of a *SECOR* geologist. Boreholes were advanced using a CME 75 hollow-stem auger drill rig. During borehole advancement, relatively undisturbed soil samples were continuously collected beginning at two feet bgs to the total depth of each boring for lithologic description and possible chemical analysis. Soil samples were collected by driving an 18-inch long modified California split-spoon sampler lined with three 6-inch long brass sample tubes. Upon retrieval, the sampler was disassembled and soils visually logged in accordance with the Unified Soil Classification System (USCS, see Boring Logs, Appendix B).

Upon retrieval of each core interval, a representative soil sample was screened in the field for the presence of volatile organic compounds (VOCs) using an Organic Vapor Monitor (OVM) equipped with a Photoionization Detector (PID). To field screen soils, approximately 10 grams of a representative soil sample were placed into a ziploc bag. After approximately 5 minutes, the tip of the OVM was inserted into the ziploc bag and VOC concentration in the headspace above the soil was recorded. The OVM readings were recorded directly on the boring log. A minimum of one sample tube per each sampling

interval was retained for possible chemical analysis. The open ends of the sample tube were covered with aluminum foil, fitted with plastic end caps, and sealed with teflon tape to minimize potential loss of moisture and volatile constituents. Sample tubes were appropriately labeled and placed in a cooler containing ice.

3.2.2 Groundwater Monitoring Well Installation

Monitoring well installation commenced after the target depth of each borehole was reached. Monitoring well depths ranged from 15 to 16 feet bgs. Monitoring wells were constructed of two-inch diameter, flush-threaded Schedule 40 PVC blank casing and 0.020-inch machine-slotted screen. Monitoring well materials were installed into the borehole through the hollow stem of the augers. A graded sand filter pack (#2/12 Monterey sand) was placed in the annular space adjacent to well screen and extended approximately 0.25 to 0.5 feet above the top of the well screen. The filter pack was poured downhole very slowly as the augers were withdrawn. Repeated soundings of the annulus were made to check for filter pack bridging. A 0.5-foot thickness of hydrated bentonite pellets was placed above the filter pack. The remainder of the annular space above the bentonite pellet seal was filled with a cement grout and extended to the ground surface. Monitoring wells were completed at ground surface within a traffic rated, leak-resistant well monument and locking well cap. Well construction details are presented in Table 1 and are shown graphically on the boring logs included in Appendix B.

SECOR submitted one soil sample from each monitoring well borehole to National Environmental Testing, Inc. (NET) for chemical analysis of TPHg, TPHd, and BTEX by EPA Methods 8015, modified and 8020, and total oil and grease (TOG) by EPA Method 5520.

3.2.3 Well Development and Sampling

On October 31, 1994 SECOR developed and sampled the wells by alternately surging the screened interval with a vented surge block and then removing water from the well with a bailer. Approximately ten well casing volumes were removed from each well during development. Prior to purging, the depth to groundwater was measured and recorded using a water level indicator accurate to within 0.01 foot. During purging, the discharge water was measured for pH, temperature, and electrical conductivity. Stabilization of these parameters is used to indicate whether fresh formation water is entering the wellbore. Water sample field data sheets are included in Appendix C. After purging, the wells were allowed to recharge prior to sampling. Samples were collected using disposable polyethylene bailers lowered into the well. Water samples were transferred directly from the bailer into laboratory-supplied sample containers. Sample containers were labeled and immediately stored in a cooler containing ice for shipment to the analytical laboratory. Groundwater samples were submitted to NET and analyzed for TPHg, TPHd, BTEX, and TOG.

3.2.4 Well Survey and Water Level Measurements

A California-licensed land surveyor surveyed the four newly-installed wells (MW-5 through MW-8) along with the existing wells (MW-1 through MW-4) to establish ground surface and top of PVC casing elevations. Static water levels were measured in each well using an electronic water level indicator accurate to within 0.01 foot. Well survey results, depth to groundwater, and groundwater elevations are shown on Table 1.

3.2.5 Decontamination and Material Containment

To minimize the potential for cross-contamination between sampling locations, all downhole drilling equipment, soil sampling equipment, and groundwater development and sampling equipment were thoroughly cleaned prior to initiating work and between each sampling location. Downhole drilling equipment was steam cleaned between each boring location. Soil sampling and groundwater development sampling equipment (e.g. sample tubes, bailers, and surge blocks) was washed in a dilute trisodium phosphate solution (TSP), rinsed with potable water, and final rinsed with distilled water between each sampling location. Because groundwater samples were collected from the monitoring wells with pre-cleaned dedicated bailers, decontamination between groundwater sampling locations was not required.

Wastes generated during this investigation included soil cuttings, development and purge water, and decontamination rinsate. Soil cuttings were stockpiled in the former AGT farm area. Development purge water and decontamination rinsate generated during the well drilling and sampling were contained in DOT-approved 55-gallon drums. All waste containers were labeled to identify contents and date of generation.

3.3 MONITORING WELL ABANDONMENT

SECOR obtained well abandonment permits from the ACFCWCD. Wells were selected for abandonment based on location, screened interval, water quality data, and/or the condition of the well. Wells W-1, W-2, W-3, W-4, and B-7 were identified for abandonment; however, we were unable to locate the wells B-7, W-3, and W-4 during the Site reconnaissance and subsequent ground penetrating radar survey. These wells were therefore not abandoned. The abandoned well locations are shown on Figure 2. Due to the shallow depth and access to the monitoring wells, abandonment was accomplished by filling the casing and borehole with a bentonite slurry through a tremie pipe. The method of abandonment was approved by ACFCWCD.

3.4 TIDAL INFLUENCE STUDY

After installation of the additional on-site monitoring wells, *SECOR* measured groundwater levels in selected monitoring wells and gauging stations over a 36-hour period. The study was performed to evaluate the influence of tidal fluctuations in the adjoining Alameda Harbor upon groundwater beneath the Site. Groundwater levels were monitored using pressure transducers and an Aquistar™ electronic data-logger system (Instrumentation Northwest DL8A). *SECOR* selected wells MW-1, MW-5, MW-6, MW-7, MW-8, and ACC's well MW-6a for inclusion in the study based on their proximity to Alameda Harbor and/or their placement at locations surrounding the former AGT farm. The data generated from well MW-7 were later discarded, due to an apparent transducer malfunction during the study. A gauging station was also located at the Grand Marina pier to measure tidal fluctuations within Alameda Harbor, immediately adjacent to the Site.

The period from December 5 to December 6, 1994 was selected for the tidal influence study based upon the relatively large anticipated tidal fluctuations as published in the 1994 Tide and Current Tables, San Francisco Bay and Delta. The relative influence of tidal fluctuations upon water table beneath the Site would be assessed by gauging the water table fluctuation during the tidal cycle, the larger and/or more rapid the water table fluctuation observed in response to the tidal change, the greater the influence of tides

A *SECOR* scientist periodically checked the gauging equipment for proper operation, and manually checked groundwater levels during the 36-hour monitoring period, to verify the accuracy of data collected with the data logger/pressure transducer system. After monitoring, water level data was reduced and analyzed to assess tidal influence in the area. Graphs depicting groundwater elevations at each gauging station are included in Appendix D.

3.5 GROUNDWATER MONITORING

The Work Plan Addendum described performance of groundwater monitoring and reporting for a one-year period. Field activities include monthly water level sounding and quarterly well purging, sampling, and sample analysis. The first three months of data are included in this document; the results of subsequent quarterly field activities will be reported on a quarterly basis.

During this reporting period, SECOR conducted soundings in October, November, and December 1994 along with an October 1994 sampling event. During monthly groundwater monitoring, *SECOR* sounded each on-site groundwater monitoring well using an electronic water-level indicator. The depth to water and total depth were measured and recorded for each well. The water-level indicator was rinsed with deionized water between the sounding of each well to prevent cross-contamination.

Prior to monitoring well sampling, each well was purged of three wellbore volumes of water using a PVC bailer and/or centrifugal pump and dedicated PVC tubing. During purging, pH, temperature, and specific conductivity was measured and the groundwater visually inspected for color and turbidity and recorded on Groundwater Sample Field Data Sheets. Upon removal of the appropriate purge volume and stabilization of the measured parameters, samples were collected from each monitoring well using a disposable bailer. Groundwater samples were decanted into prelabeled laboratory-supplied glassware, placed in an ice-filled cooler, accompanied by a completed chain-of-custody form, and transported to NET, a California state-certified testing laboratory for chemical analysis.

4.0 SUMMARY OF RESULTS

The results of *SECOR*'s Subsurface Investigation, including Well Installation, Groundwater Sampling, and Tidal Influence Study, are described below.

4.1 SOIL INVESTIGATION RESULTS

As noted in Section 3.2, a total of six soil borings were advanced to depths ranging from 5 to 18.5 feet bgs at the locations shown on Figure 2. Four of the borings were completed as groundwater monitoring wells (MW-5 through MW-8). Two additional borings were also advanced and subsequently abandoned. One of these borings was advanced as a result of abandoning the initial boring for MW-5. The second boring (TP-3A) was advanced in the area between MW-2 and TP-3 to further characterize soils and first encountered groundwater in the area. Soil samples were collected from all borings for physical description, and in some instances, for chemical analysis.

4.1.1 Soil Conditions

The soil types encountered during the Subsurface Investigation (see Cross-sections A-A' and B-B' on Figures 3 and 4) were consistent with previous investigations. Encountered soils included unconsolidated artificial fill material, fine-grained sandy soils, and native Bay Mud. The fill consisted of silty sands, gravel, and debris such as brick and wood fragments. Fill at the Site extended to depths of one to six feet bgs. Fine-grained sand was often encountered beneath the fill material; the sand typically contained clay and gravel in trace to subdominant amounts. Bay Mud, consisting of soft, gray-black, black, and greenish-black silty clay, was encountered at depths between five and ten feet bgs and extended to the total depth of each borehole. In some instances, the Bay Mud contained sandy horizons. Additionally, peat was encountered between 13 and 14 feet bgs in wellbores MW-5, MW-6, MW-7, and MW-8.

Hydrocarbon, sulphur, and organic odors were noted in most of the soil borings. In addition, elevated PID readings were common of soil samples removed from the investigatory boreholes. These observations are consistent with previous investigation findings.

4.1.2 Chemical Analysis of Soils

As noted in Section 3.1.1, elevated PID readings were commonly observed in vadose zone soil samples removed from the investigatory borings (see boring logs in Appendix B). *SECOR* selected representative vadose zone soil samples which exhibited elevated PID readings and/or noticeable odors for chemical analysis. The analyzed soil samples were selected from the 2.0 to 6.0 foot bgs depth interval; the target sample interval for chemical analysis was estimated to be from 2.0 to 5.0 feet bgs, with actual samples selected based upon the observed soil types, and field observations such as staining, odor, and PID readings.

Seven soil samples were analyzed for TPHd, six of which contained concentrations above the laboratory detection limit (see Figure 5 and Table 2). The greatest TPHd concentrations were reported in samples from borings TP-3A (1,400 mg/kg) and MW-7 (240 mg/kg), with lesser concentrations reported in samples from borings MW-5 (23 to 27 mg/kg), MW-6 (28 mg/kg), and MW-8 (97 mg/kg). Seven soil samples were analyzed for TPHg and BTEX. A sample from boring MW-8 contained reportable

concentrations of TPHg (20 mg/kg), toluene (5.7 micrograms per kilogram or μg/kg), ethylbenzene (10 μg/kg), and xylenes (84 μg/kg). The sample from boring MW-7 contained reportable concentrations of xylenes (15 μg/kg). Of the seven soil samples analyzed, six contained TOG concentrations above the 50 mg/kg detection limit. The greatest TOG concentration was reported in the sample from boring TP-3A (6,900 mg/kg). Concentrations of TOG were also reported in samples from borings MW-5-, MW-6, MW-7, and MW-8 at 160 to 280, 930, 180, and 390 mg/kg, respectively. No other concentrations of TPHd, TPHg, TOG, or BTEX were reported. The laboratory analytical results and Chain-of-Custody Records are provided in Appendix E. Table 2 and Figure 5 summarize the chemical analytical results for the selected soil samples.

4.2 GROUNDWATER MONITORING RESULTS

4.2.1 Groundwater Conditions

SECOR converted the water level survey data collected on October 31, November 30, and December 29, 1994 to msl elevations. The depth to water measured in on-site monitoring wells ranged from 1.99 to 6.06 feet bgs. These data correspond to msl elevations ranging from 1.1 to 6.05 feet, as shown on Table 1. Figures 7, 8, and 9 depict these data as contoured groundwater elevations. In general, groundwater beneath the Site appears to flow toward the southeast with a lesser flow component toward the northwest, roughly paralleling the Alameda Harbor shoreline. Groundwater elevations beneath the Site are lowest in the southeastern portion of the Site and are highest along the northeastern portion of the Site.

4.2.2 Chemical Analysis of Groundwater

SECOR conducted well sampling on October 31, 1994. Wells were purged prior to sampling by removing a minimum of ten wellbore volumes of water using a PVC bailer. During purging, pH, temperature, and electrical conductivity were measured and the groundwater was visually inspected for color and turbidity. Groundwater samples exhibited pH values ranging from 7.10 to 8.34 pH units; temperatures ranging from 64.6 to 83.3 degrees Fahrenheit; specific conductivities ranging from 11,000 to more than 20,000 micromhos per centimeter (μmhos/cm); appearance was generally tan; and turbidity generally high. These measurements were recorded in the field on Groundwater Sample Field Data Sheets included in Appendix C.

SECOR collected a total of eight primary water samples from newly-installed and existing wells for chemical analysis. Each of the submitted samples were analyzed for TPHd, TPHg, BTEX, and TOG. The analytical results are summarized on Table 3 and are presented on Figure 6. All of the analyzed samples contained reportable TPHd concentrations; the sample collected from well MW-2 contained the highest TPHd concentration of 4.2 milligrams per liter (mg/L). The samples collected from wells MW-1, MW-3, MW-4, MW-5, MW-6, MW-7, and MW-8 contained TPHd concentrations of 0.4, 0.14, 0.24, 0.56, 0.5, 0.97, and 1.0 mg/L, respectively.

Three of the analyzed samples contained reportable TPHg concentrations The sample collected from well MW-2 contained the highest TPHg concentration of 22 mg/L. The samples collected from wells MW-1 and MW-3 contained TPHg at 0 08 and 0.11 mg/L, respectively

Three of the analyzed samples contained reportable concentrations of BTEX. Well MW-2 yielded the highest concentrations of BTEX at 2,000, 4,800, 500, and 2,700 micrograms per liter (μg/L), respectively. The sample collected from well MW-1 contained concentrations of toluene and xylenes at 1.1 and 1.4 μg/L, respectively. The sample collected from well MW-3 contained ethylbenzene and xylenes at concentrations of 2.4 and 5.2 μg/L respectively. The sample collected from well MW-2 contained a TOG concentration of 13 mg/L. TOG was not detected at reportable concentrations in other sampled wells. The laboratory reports and Chain-of-Custody Records are included in Appendix E.

4.3 TIDAL INFLUENCE STUDY

Water levels measured during the tidal influence study were converted to msl elevations as depicted on hydrographs presented in Appendix D and Figures D1 through D7. As shown on Figure 10, during a tidal fluctuation of 8.42 feet (from 4.47 feet above msl to 3.95 feet below msl), the water table surface remained relatively consistent, with a generally southeast groundwater flow direction. The hydrographs and elevation contours differ from water elevations obtained from the pier gauging point (Figure D1 in Appendix D). Water levels periodically fluctuated beneath the Site; the fluctuation does not directly coincide with a tidal fluctuation. This is illustrated on the hydrographs by a sharp drop over a fifteen minute interval in subsurface water levels just after high tide is reached.

The hydrographs for wells located across the Site reveal varying water level fluctuations in response to tidal fluctuation. In general, wells located along the harbor shoreline show different water level fluctuations than those located within the Site interior. Many of the shoreline well hydrographs show similar but less dramatic fluctuations when compared with tidal fluctuations. The Site interior wells, particularly those nearest the former AGT farm exhibit water level fluctuations which rose concurrent with sea level (pier gauging station) drops; the AGT farm well water levels also dropped concurrent with sea level rise. Based upon the groundwater elevation contour maps presented as Figures 7 through 10, a groundwater pumping or withdrawal source appears to be located east of the Site along or across Grand Street.

4.4 DISCUSSION

The available data reveal that vadose zone soils and shallow groundwater beneath the Site have been impacted by petroleum hydrocarbons. The apparent widespread distribution of hydrocarbons in vadose zone soils may be due to constituent migration in groundwater, followed by constituent "smearing" during water table fluctuation. This is evidenced on the cross sections presented on Figures 3 and 4. Thus, the vadose zone samples may actually have been periodically within the submerged or saturated horizon.

Groundwater elevations and flow direction differ from those anticipated for the Site setting. The observed elevations were higher in wells located nearest Alameda Harbor and lowest in wells located furthest from the Harbor. The estimated groundwater flow direction parallels the Harbor shoreline. This may be partially or wholly induced by groundwater removal (extraction) from unidentified, off-site sources. The groundwater flow direction trend paralleling the shoreline may be explained (partially or wholly) by preferential Harbor-subsurface communication via fill materials at a point or points located northwest and southeast of the Site.

5.0 CONCLUSIONS

The recently-completed Subsurface Investigation performed in the vicinity of the former AGT farm by *SECOR* yielded information regarding the nature and extent of hydrocarbon compounds in soil and groundwater beneath the Site, the condition of subsurface soils, hydraulic characteristics of the shallow water-bearing zone beneath the Site, and the relationship between tidal fluctuations and the shallow water table beneath the Site. *SECOR's* conclusions with respect to the investigation may be summarized as follows:

- Soil types encountered during the investigation were consistent with those previously-encountered; artificial fill is underlain by fine-grained sand, possibly the Merritt Sand, and Bay Mud with interbedded peat in descending order.

- Groundwater is present beneath the Site at shallow and fluctuating depths. The generalized groundwater flow direction appears to be toward the southeast, with a lesser flow component toward the northwest. Groundwater beneath the Site appears to be confined to semi-confined, based upon elevation measurements consistently above mean sea level and tidal influence study, data.

- The shallow water-bearing zone beneath the Site may be partially influenced by tidal fluctuations. The relatively sharp groundwater level increases observed during sea level drop and similarly sharp groundwater level decreases associated with a rise in sea level indicate the possibility of significant groundwater withdrawal nearby. Based on the tidal influence study, there does not appear to be hydraulic communication between the Alameda Harbor and the former AGT farm area.

- Diesel, and oil and grease were the most persistent compounds present, and were reported in shallow soil samples collected from the northern, southern, and eastern portions of the Site. With the exception of the sample collected from borehole TP-3A, the reported analyte concentrations were low. With the exception of the vicinity of boreholes/wells MW-6, MW-8, and TP-3/3A, the extent of these compounds in soil appears to have been characterized. The presence of gasoline and BTEX compounds appears to be localized to the vicinity of boreholes/wells MW-7, MW-8, and TP-3.

- Diesel-impacted groundwater was present in each of the sampled monitoring wells, with the highest concentrations reported in samples collected east and south of the former AGT farm. Prior groundwater grab sample analyses yielded similar results. The presence of oil and grease and gasoline/BTEX compounds appeared to be present in isolated locations, including well MW-6 adjacent to the on-site underground pipelines and boreholes/wells TP-3, MW-2, and MW-3.

- The extent of constituents of concern in soil and groundwater beneath the Site has not been characterized The primary areas lacking characterization include the area south of the former AGT farm, the eastern portion of the Site near boring/well MW-8, and along the underground pipelines near borings/wells PL-2 and MW-6 The constituent concentrations reported in the analyzed soil and groundwater samples are generally low and consist primarily of "heavier" hydrocarbons which are of low mobility and toxicity relative to gasoline and BTEX compounds

- The apparent groundwater withdrawal performed at an unknown, nearby location may have modified groundwater flow direction(s) and the possible migration of hydrocarbon compounds in groundwater. Hydrocarbons appear to be migrating in groundwater toward the southeast as evidenced by the reported analyte concentrations in the groundwater sample collected from well MW-8. The groundwater withdrawal may also inhibit migration of constituents toward Alameda Harbor, based upon the observed groundwater level measurements and resulting potentiometric surface maps.

- Fluctuating water levels beneath the Site, whether due to a confined or semi-confined water table, groundwater pumping, tidal influence, or a combination of these, may have effectively "smeared" hydrocarbons onto soils present within the range of water level fluctuation. This may account for the apparent widespread presence of hydrocarbons in shallow soils across the Site.

- The available data suggest the widespread presence of relatively immobile hydrocarbons distributed vertically across a "smear zone" by fluctuating groundwater levels. The need for removing the low-mobility and low toxicity constituents present beneath the Site is questionable. Given the type and extent of constituents present in the Site subsurface, the lack of demonstrated impact to the waters of the Alameda Harbor, and the extremely low likelihood of impact to human health or the environment, we recommend no further action for the Site.

6.0 REFERENCES

Alameda Building Department Files.

Alameda City Manager Files.

Alameda Fire Department Files.

Alameda County Department of Health Services, Toxic Substances Control Division, Inspection Report: Pennzoil Products Company, 2015 Grand Street, Alameda, California, April 18, 1989.

Bloomfield, Anne, Site History of the Encinal Marina Project, 2051 Grand Street, Alameda, California, March 1987.

Harding Lawson Associates (HLA), Environmental Assessment Encinal Marina Alameda California, HLA Job No. 19247,001.02, July 17, 1987.

HLA, Petroleum Hydrocarbons in Soils and Groundwater Fuel Storage Area Encinal Marina Alameda, California, HLA Job No. 18247,001.02, July 17, 1987.

Kaldveer Associates, Groundwater Quality Report for 1829 Clement Avenue, Alameda, California, KA Job No. KE1179-1A-272, November 5, 1990.

Pacific Aerial Surveys, Aerial Photographs dated April 8, 1992; June 12, 1990; May 15, 1985; June 22, 1981; May 29, 1975; May 19, 1971; April 20, 1966; July 3, 1959; August 14, 1953; April 14, 1950; and March 24, 1947.

Sanborn Fire Insurance Maps dated 1987, 1948, and 1897.

SECOR International Incorporated (*SECOR*), 1993, Work Plan to Conduct Additional Site Investigation, Grand Marina Facility, 2099 Grand Street, Alameda, California, June 4, 1993.

SECOR International Incorporated (*SECOR*), 1994, Summary Report, Additional Site investigation, Grand Marina Facility, 2099 Grand Street, Alameda, California, April 6, 1994.

SECOR International Incorporated (*SECOR*), 1994, Work Plan Addendum, Further Subsurface Investigation and monitoring, 2099 Grand Street, Alameda, California, October 11, 1994.

Soil Tech Engineering, Inc., Additional Investigation for Weyerhauser Paper Company Property Located at 1811 Hibbard Street, Alameda, California, ST Job No. 10-91-483-MW, January 28, 1993

The Tidebook Company, 1994 Tide and Current Tables, San Francisco Bay and Delta, 1994.

Unocal, Response to Inquiry from *SEACOR*, February 2, 1994.

Uriah, Inc., Summary of the Subsurface Investigation performed at Encinal Marina located at 2041 Grand Street in Alameda, California, June 3, 1988.

U.S. Geological Survey et. al., 1979, Flatland Deposits - Their Geology and Engineering Properties and Their Importance to Comprehensive Planning, (Geological Survey Professional Paper 943), 1979

Zaccor Corporation, A Report Documenting a Limited Environmental Site Assessment of Soil and Groundwater at Grand Marina Foot of Grand Street Alameda, California, June 26, 1992.

Personal Communication

Mr. Andy Andrews, Coast Oil Company, December 21, 1993.

Mr. Bert Barber, former HTB employee, November 1993.

Mr. Lester Bediant, former HTB employee, November 1993.

Mr. Curt Bolton, Harbormaster, Grand Marina, December 14, 1993.

Mr. John Dunn, former HTB employee, November 1993.

Mr. Don Holgate, former HTB employee, November 1993.

Mr. Dennis O'Keefe, Golden Gate Petroleum, November 1993.

Mr. Jim Sanderson, Alameda County Department of Public Works, Engineering Division, January 1995

Mr. Marc Singer, Alameda County Department of Public Works, Maintenance Division, January 1995

Table 1
Well Construction and Groundwater Elevations
October, November, and December 1994
Grand Marina
2099 Grand Street
Alameda, California

Well	Total Depth (ft)	Screened Interval (ft)	Top of Casing Elevation (ft. MSL)	Date Measured	Depth to Water (ft.bgs)	Groundwater Elevation (ft.bgs)
MW-1	15.00	3-15	6.77	10/31/94	3.70	3.07
				11/30/94	3.27	3.50
				12/29/94	3.31	3.46
MW-2	15.00	3-15	4.83	10/31/94	2.60	2.23
				11/30/94	3.26	1.57
				12/29/94	2.28	2.55
MW-3	15.00	3-15	7.28	10/31/94	4.76	2.52
				11/30/94	3.34	3.94
				12/29/94	3.63	3.65
MW-4	15.00	3-15	5.21	10/31/94	3.00	2.21
				11/30/94	2.63	2.58
				12/29/94	3.03	2.18
MW-5	13.75	3.5-13.5	8.26	10/31/94	5.76	2.50
				11/30/94	5.22	3.04
				12/29/94	5.16	3.10
MW-6	14.25	4-14	8.14	10/31/94	6.06	2.08
				11/30/94	5.45	2.69
				12/29/94	5.36	2.78
MW-7	13.55	3.5-13.5	5.91	10/31/94	3.86	2.05
				11/30/94	3.07	2.84
				12/29/94	2.76	3.15
MW-8	13.50	3.5-13.5	5.65	10/31/94	3.92	1.73
				11/30/94	2.21	3.44
				12/29/94	2.39	3.26
MW-5a	12.25	3-13	5.01	10/31/94	3.00	2.01
				11/30/94	NR	NR
				12/29/94	1.99	3.02
MW-6a	12.36	3-13	4.96	10/31/94	3.86	1.10
				11/30/94	NR	NR
				12/29/94	2.73	4.96

NR - No Reading Due to Inaccessibility of Well

Table 2
Soil Chemical Analytical Data
October 26 and 27, 1994

Well/Boring Depth	TPH-g (mg/kg)	TPH-o (mg/kg)	TPH-d (mg/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Xylenes (Total) (ug/kg)
TP3A-2	<1	6900	1400	<2.5	<2.5	<2.5	<2.5
MW-5-2.5	<1	160	23	<2.5	<2.5	<2.5	<2.5
MW-5-5	<1	280	27	<2.5	<2.5	<2.5	<2.5
MW-5A-6	<1	<50	<1	<2.5	<2.5	<2.5	<2.5
MW-6-2.5	<1	930	28	<2.5	<2.5	<2.5	<2.5
MW-7-2	<1	180	240	<2.5	<2.5	<2.5	15
MW-8-3.5	20	390	97	<5	5.7	10	84

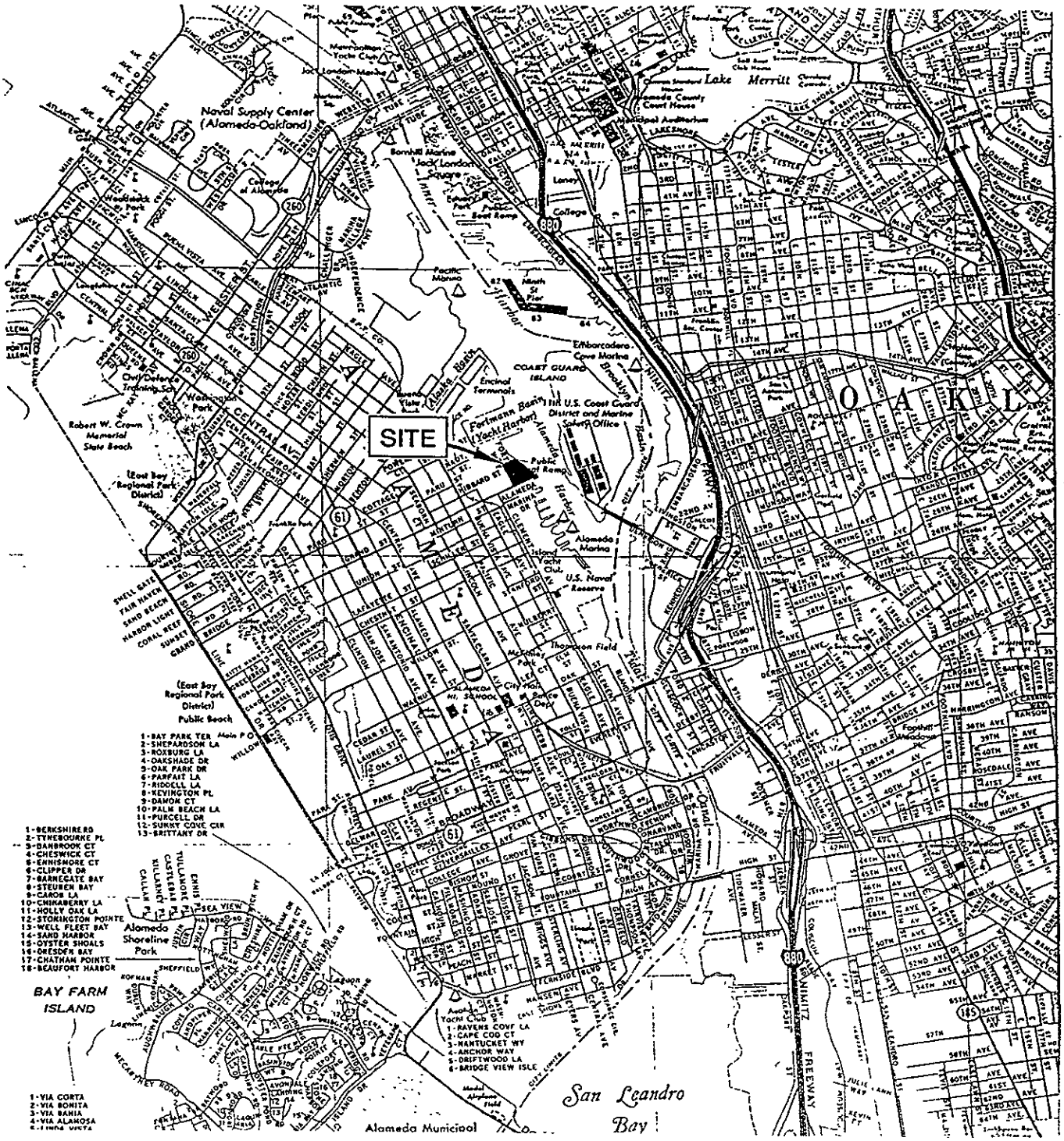
TPH-g Total Petroleum Hydrocarbons as gasoline
TPH-o Total Petroleum Hydrocarbons as oil and grease
TPH-d Total Petroleum Hydrocarbons as diesel
mg/kg milligrams per kiligrams
ug/kg micrograms per kilogram

Table 3
Groundwater Chemical Analysis Data
October 31 and November 1, 1994

Well	TPH-g (mg/L)	TPH-G (mg/L)	TPH-d (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (Total) (ug/L)
MW-1	0.08	<5	0.4	<0.5	1.1	<0.5	1.4
MW-2	22	13	4.2	2200	4800	500	2700
MW-3	0.11	<5	0.14	<0.5	<0.5	2.4	5.2
MW-4	<0.05	<5	0.24	<0.5	<0.5	<0.5	<0.5
MW-5	<0.05	<5	0.56	<0.5	<0.5	<0.5	<0.5
MW-6	<0.05	<5	0.5	<0.5	<0.5	<0.5	<0.5
MW-7	<0.05	<5	0.97	<0.5	<0.5	<0.5	<0.5
MW-8	<0.05	<5	1	<0.5	<0.5	<0.5	<0.5

mg/L: milligrams per liter

ug/L: micrograms per liter



SOURCE: BASE MAP FROM H.M. GOUSHA, 1988.
OAKLAND AND EAST BAY CITIES

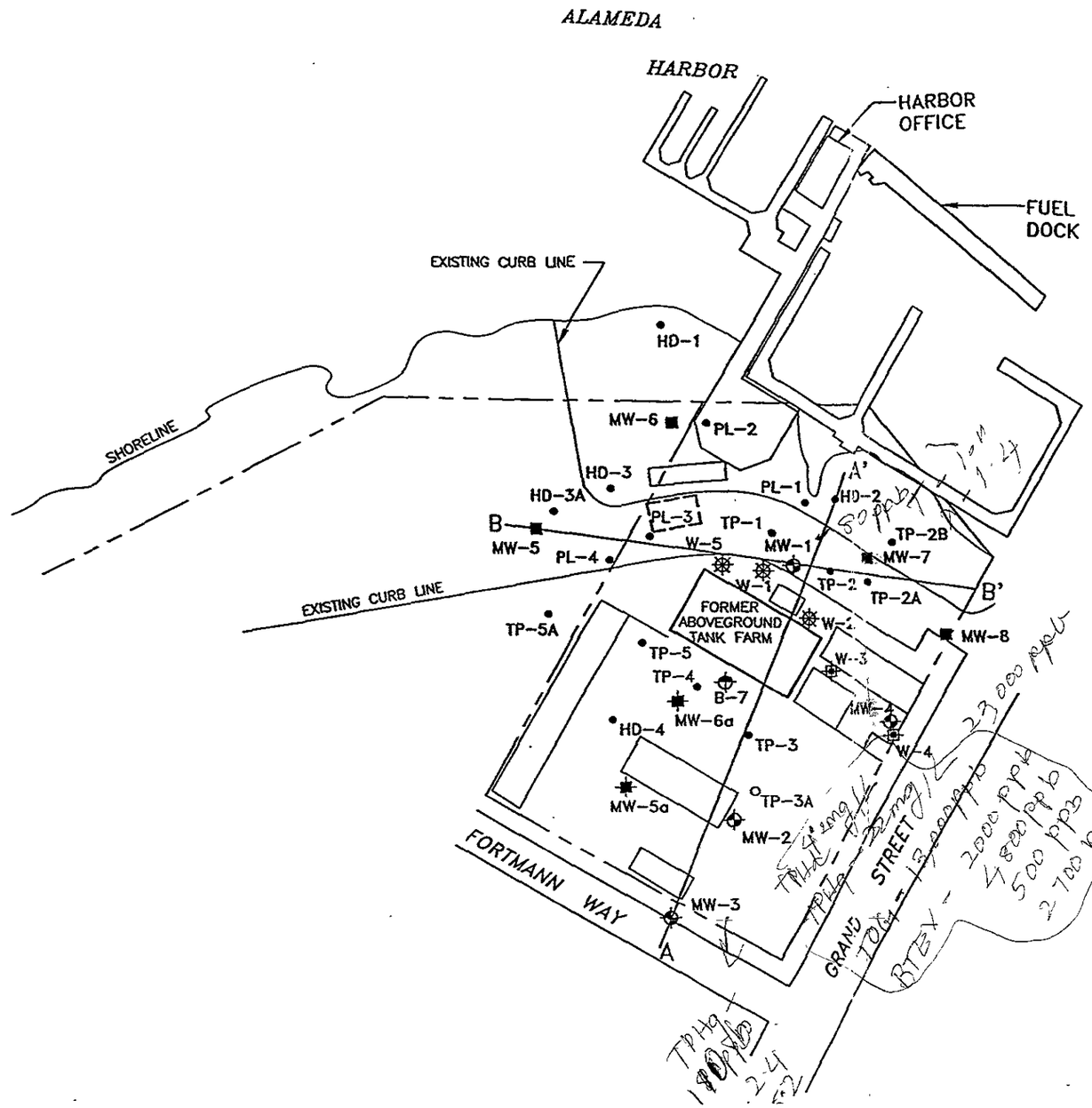
NORTH

0 1
SCALE MILE

SECOR INTERNATIONAL INCORPORATED	DRAWN: CGR
	CHKD: JGP
	DATE: 25JAN95
	JOB NO: 56065-001-01

FIGURE 1

SITE LOCATION MAP



LEGEND

MW-5a ✱	MONITORING WELL (ACC, 10/94)
MW-8 ■	MONITORING WELL (SECOR, 10/94)
TP-3A ○	BORING (SECOR, 10/94)
PL-2 •	BORING (SECOR, 10/93)
MW-1 ⊕	MONITORING WELL (ZACCOR, 5/92)
B-7 ⊕	MONITORING WELL (HARDING-LAWSON, 6/87)
W-3 ✱	ABANDONED MONITORING WELL (CROWLEY ENVIRONMENTAL SERVICES, 4/87)
W-4 ⊕	MONITORING WELL (CROWLEY, 4/87)
— — — —	PROPERTY LINE
B———B'	LINE OF CROSS SECTIONS

N

0 100 200
SCALE FEET

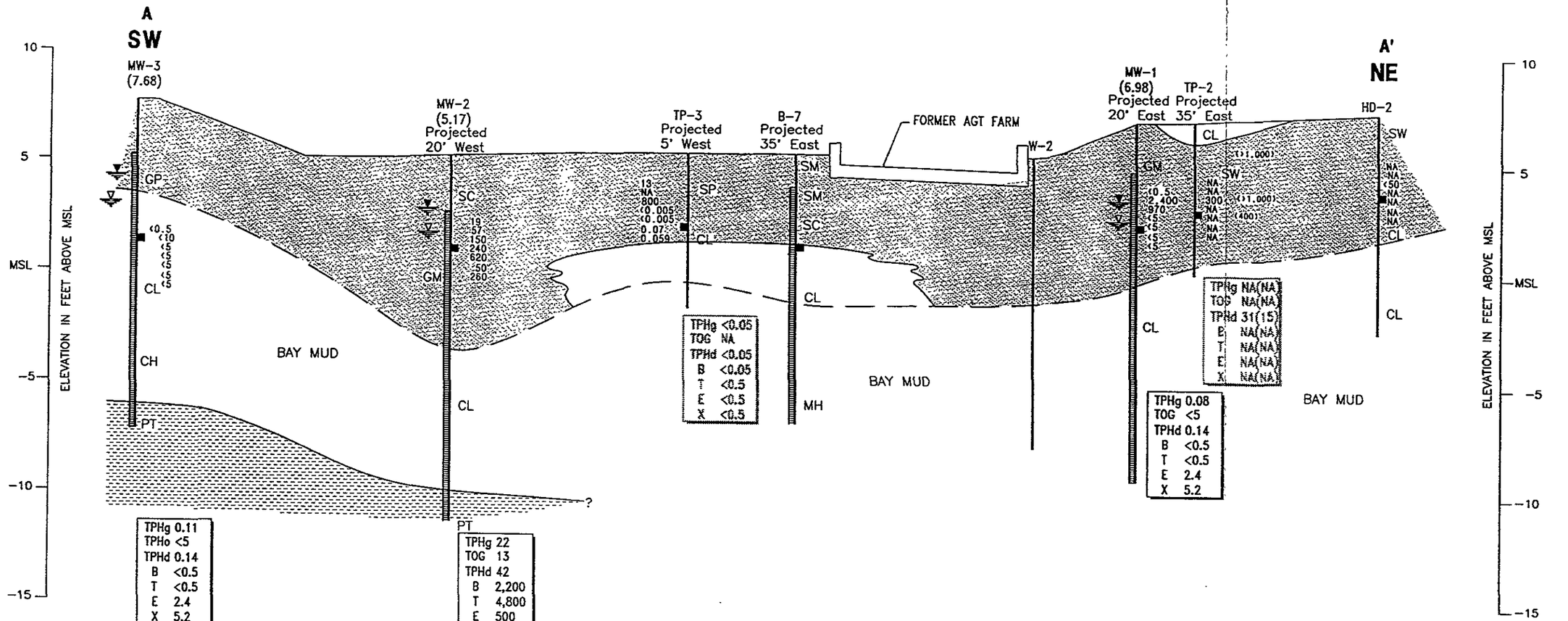
SOURCE: BASED ON SURVEY BY RON ARCHER, CIVIL ENGINEER INC., NOVEMBER 1994

SECOR INTERNATIONAL INCORPORATED	DRAWN KN APPR JGR DATE 06DEC94 JOB NO 50085-001-01

FIGURE 2
GRAND MARINA FACILITY
ALAMEDA, CALIFORNIA

SITE PLAN

199501.131731 I:\JOBS\MARINA\SITEPL1



LEGEND:

MW-7 — Well/Boring Name
(5.91) — Top of Casing Elevation
Well Casing
Soil Sample
Filter Pack Interval Including Screened Interval
(53) — PID Reading (ppm)

Peat
Silt and Clay Dominated Soil
Sand and Gravel Dominated Soil
Low Range Water Level Elevation
High Range Water Level Elevation

CHEMICAL ANALYTICAL RESULTS:

Soil / Water

Analyte

340 / 2,000 / 660 / <0.5 / 0.87 / 1.0 / 2.1

TPHg 19
TOG 57
TPHd 0.97
B 240
T <0.5 — Not Detected at or above Laboratory Reporting Limit
E 50
X NA — Not Analyzed

NOTES:

FOR SOIL: TPHg, TPHd, TOG CONCENTRATIONS MEASURED IN mg/kg.
BTEX CONCENTRATION MEASURED IN ug/kg.
FOR WATER: TPHg, TPHd, TOG CONCENTRATIONS MEASURED IN mg/l.
BTEX CONCENTRATION MEASURED IN ug/l

SLACKD DATA COLLECTED OCTOBER 28, 9[illegible] NO DATA ON POTO AT TIME OF BORING/WELL INSTALLATION

ANALYTES:

TPHg	Total Petroleum Hydrocarbons as Gasoline
TOG	Total Petroleum Hydrocarbons as Oil
TPHd	Total Petroleum Hydrocarbons as Diesel
B	Benzene
T	Toluene
E	Ethylbenzene
X	Xylenes

5
0 30
FEET

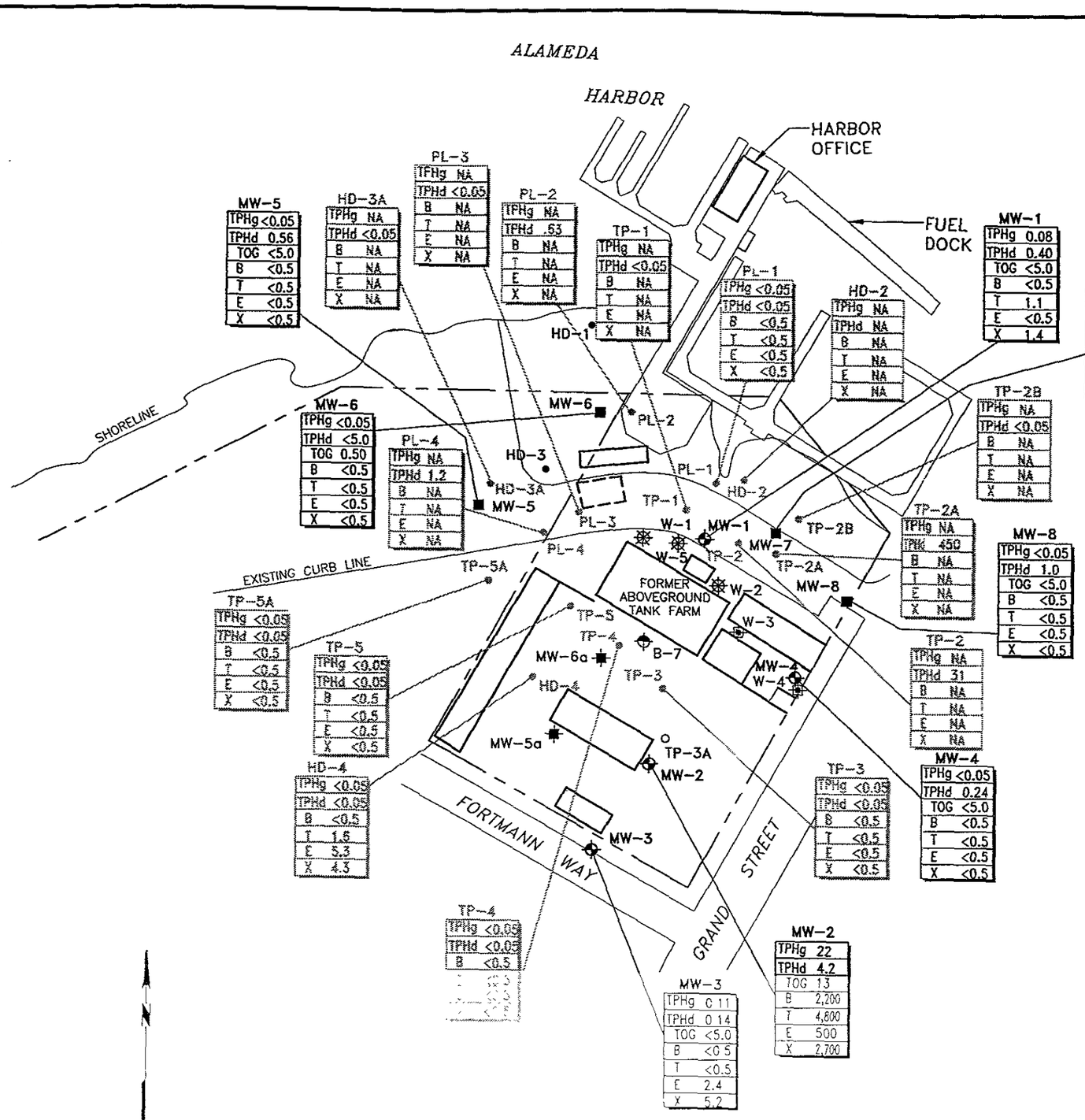
SECOR INTERNATIONAL INCORPORATED

DRAWN	KN
APPR	JGR
DATE	19JAN95
JOB NO	50085-001-01

FIGURE 3
GRAND MARINA FACILITY
ALAMEDA, CALIFORNIA

GENERALIZED GEOLOGIC CROSS SECTION A-A'

199501 191737 I:\JOBS\MARINA\SECTIONA



SOURCE BASED ON SURVEY BY RON ARCHER, CIVIL ENGINEER INC., NOVEMBER 1994

LEGEND

- MW-5a ✸ MONITORING WELL (ACC, 10/94)
- MW-8 ■ MONITORING WELL (SECOR, 10/94)
- TP-3A ○ BORING (SECOR, 10/94)
- PL-2 • BORING (SECOR, 10/93)
- MW-1 ⊕ MONITORING WELL (ZACCOR, 5/92)
- B-7 ⊕ MONITORING WELL (HARDING-LAWSON, 6/87)
- W-3 ✳ ABANDONED MONITORING WELL (CROWLEY ENVIRONMENTAL SERVICES, 4/87)
- W-4 ⊕ MONITORING WELL (CROWLEY, 4/87)
- PROPERTY LINE

CHEMICAL ANALYTICAL RESULTS:

MW-8 — Boring/Well Number
Analyte

TPHg	20
TPHd	97
TOG	390
B	<0.5 — Not Detected Above Laboratory Detection Limit
T	5.7
E	10
X	NA — Not Analyzed

ANALYTES:

TPHg	Total Petroleum Hydrocarbons as Gasoline
TPHd	Total Petroleum Hydrocarbons as Diesel
TOG	Total Oil and Grease
B	Benzene
T	Toluene
E	Ethylbenzene
X	Xylenes

NOTES:

BTEX RESULTS REPORTED IN MICROGRAMS PER LITER (ug/L), OTHER ANALYTE CONCENTRATIONS REPORTED IN MILLIGRAMS PER LITER (mg/L).

SHADED DATA COLLECTED ON OCTOBER 27 AND 28, 1993.

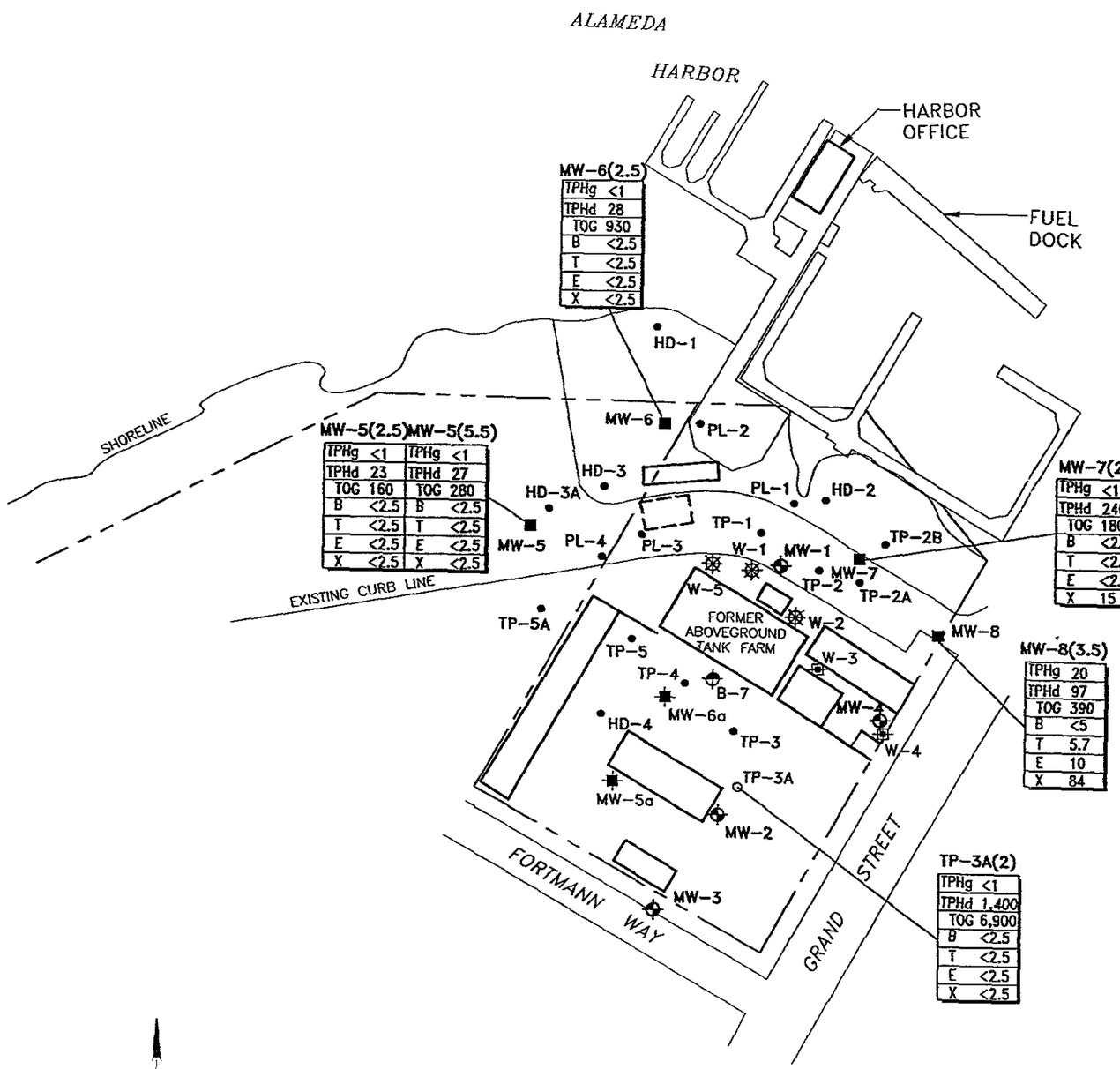
199501 161117 I:\JOBS\MARINA\MAR1H20

SECOR INTERNATIONAL INCORPORATED

DRAWN	KN
APPR	JGR
DATE	16JAN95
JOB NO	50085-001-01

FIGURE 6
GRAND MARINA FACILITY
ALAMEDA, CALIFORNIA

GROUNDWATER CHEMICAL ANALYTICAL RESULTS-OCTOBER 27 AND 28, 1993 OCTOBER 31 AND NOVEMBER 1, 1994



LEGEND

- MW-5a ✱ MONITORING WELL (ACC, 10/94)
- MW-8 ■ MONITORING WELL (SECOR, 10/94)
- TP-3A ○ BORING (SECOR, 10/94)
- PL-2 • BORING (SECOR, 10/93)
- MW-1 ⊕ MONITORING WELL (ZACCOR, 5/92)
- B-7 ⊕ MONITORING WELL (HARDING-LAWSON, 6/87)
- W-3 ✱ ABANDONED MONITORING WELL (CROWLEY ENVIRONMENTAL SERVICES, 4/87)
- W-4 ⊕ MONITORING WELL (CROWLEY, 4/87)
- —— – – – —— PROPERTY LINE

CHEMICAL ANALYTICAL RESULTS:

MW-8(3.5) Boring Number (Sample Depth)

Analyte

TPHg	20
TPHd	97
TOG	390
B	NA — Not Analyzed
T	<2.5 — Not Detected Above Laboratory Reporting Limit
E	10
X	84

ANALYTES:

TPHg	Total Petroleum Hydrocarbons as Gasoline
TPHd	Total Petroleum Hydrocarbons as Diesel
TOG	Total Oil and Grease
B	Benzene
T	Toluene
E	Ethylbenzene
X	Xylenes

NOTE:

TPHg, TPHd, AND TOG CONCENTRATIONS MEASURED IN mg/kg.
BTEX CONCENTRATIONS MEASURED IN ug/kg.

SOURCE: BASED ON SURVEY BY RON ARCHER, CIVIL ENGINEER INC., NOVEMBER 1994

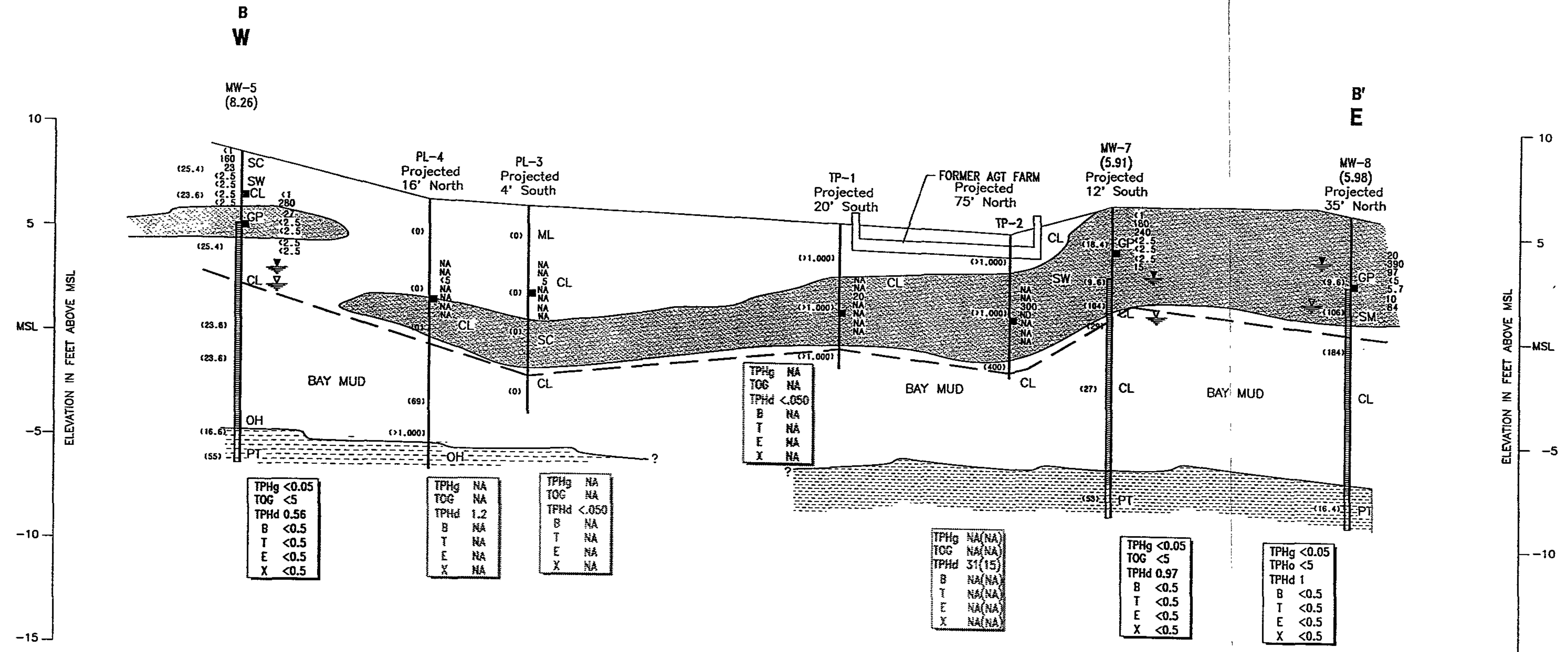
199501.191140 I:\JOBS\MARINA\MAR19OCT

SECOR INTERNATIONAL INCORPORATED

DRAWN	KN
APPR	JGR
DATE	16JAN95
JOB NO	50085-001-01

FIGURE 5
GRAND MARINA FACILITY
ALAMEDA, CALIFORNIA

SOIL CHEMICAL ANALYTICAL RESULTS-OCTOBER 26 AND 27, 1994



LEGEND:

MW-7 — Well/Boring Name
(5.91) — Top of Casing Elevation
Well Casing
Soil Sample
Filter Pack Interval Including Screened Interval
(53) — PID Reading (ppm)

Peat

Silt and Clay Dominated Soil

Sand and Gravel Dominated Soil

Low Range Water Level Elevation

High Range Water Level Elevation

Bay Mud Contact

CHEMICAL ANALYTICAL RESULTS:

Soil — Water

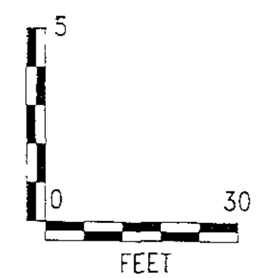
Soil	Water	
NA	TPHg <0.05	Analyte
NA	TOG <5	Not Detected at or above Laboratory Reporting Limit
20	TPHd 0.97	
NA	B <0.5	
NA	T <0.5	
NA	E NA	Not Analyzed
NA	X NA	

ANALYTES:

TPHg	Total Petroleum Hydrocarbons as Gasoline
TOG	Total Petroleum Hydrocarbons as Oil
TPHd	Total Petroleum Hydrocarbons as Diesel
B	Benzene
T	Toluene
E	Ethylbenzene
X	Xylenes

NOTES:

FOR SOIL: TPHg, TPHc, TOG CONCENTRATIONS MEASURED IN mg/kg. BTEX CONCENTRATION MEASURED IN ug/kg
FOR WATER: TPHg, TPHd, TOG CONCENTRATIONS MEASURED IN mg/l. BTEX CONCENTRATION MEASURED IN ug/l
[illegible] DATA COLLECTED OCTOBER [illegible] AT TIME OF BORING/WELL INSTALLATION



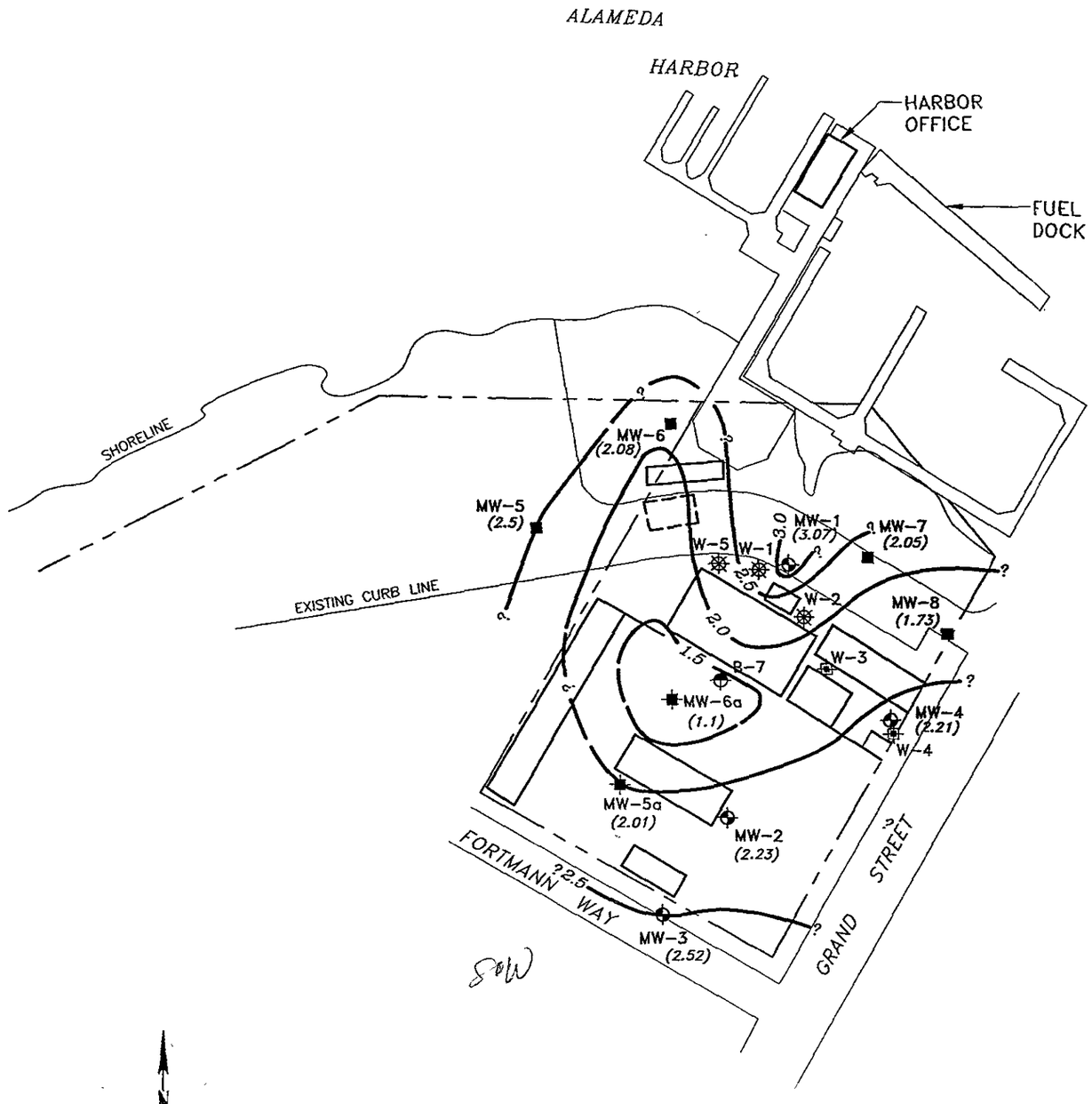
SECOR INTERNATIONAL INCORPORATED

DRAWN	KN
APPR	JGR
DATE	19JAN95
JOB NO	50085-001-01

FIGURE 4
GRAND MARINA FACILITY
ALAMEDA CALIFORNIA

GENERALIZED GEOLOGIC CROSS SECTION B-B'

199501 191737 I:\JOBS\MARINA\SECTIONB



LEGEND

MW-5a ✱	MONITORING WELL (ACC, 10/94)
MW-8 ■	MONITORING WELL (SECOR, 10/94)
MW-1 ⊕	MONITORING WELL (ZACCOR, 5/92)
B-7 ⊕	MONITORING WELL (HARDING-LAWSON, 6/87)
W-3 ✱	ABANDONED MONITORING WELL (CROWLEY ENVIRONMENTAL SERVICES, 4/87)
W-4 ⊕	MONITORING WELL (CROWLEY, 4/87)
(2.5)	GROUNDWATER ELEVATION (FEET MSL)
2.0 ———	GROUNDWATER ELEVATION CONTOUR (FEET MSL)
— — — —	PROPERTY LINE

N

0 100 200
SCALE FEET

SOURCE BASE ON SURVEY BY RON ARCHER, CIVIL ENGINEER INC., NOVEMBER 1994

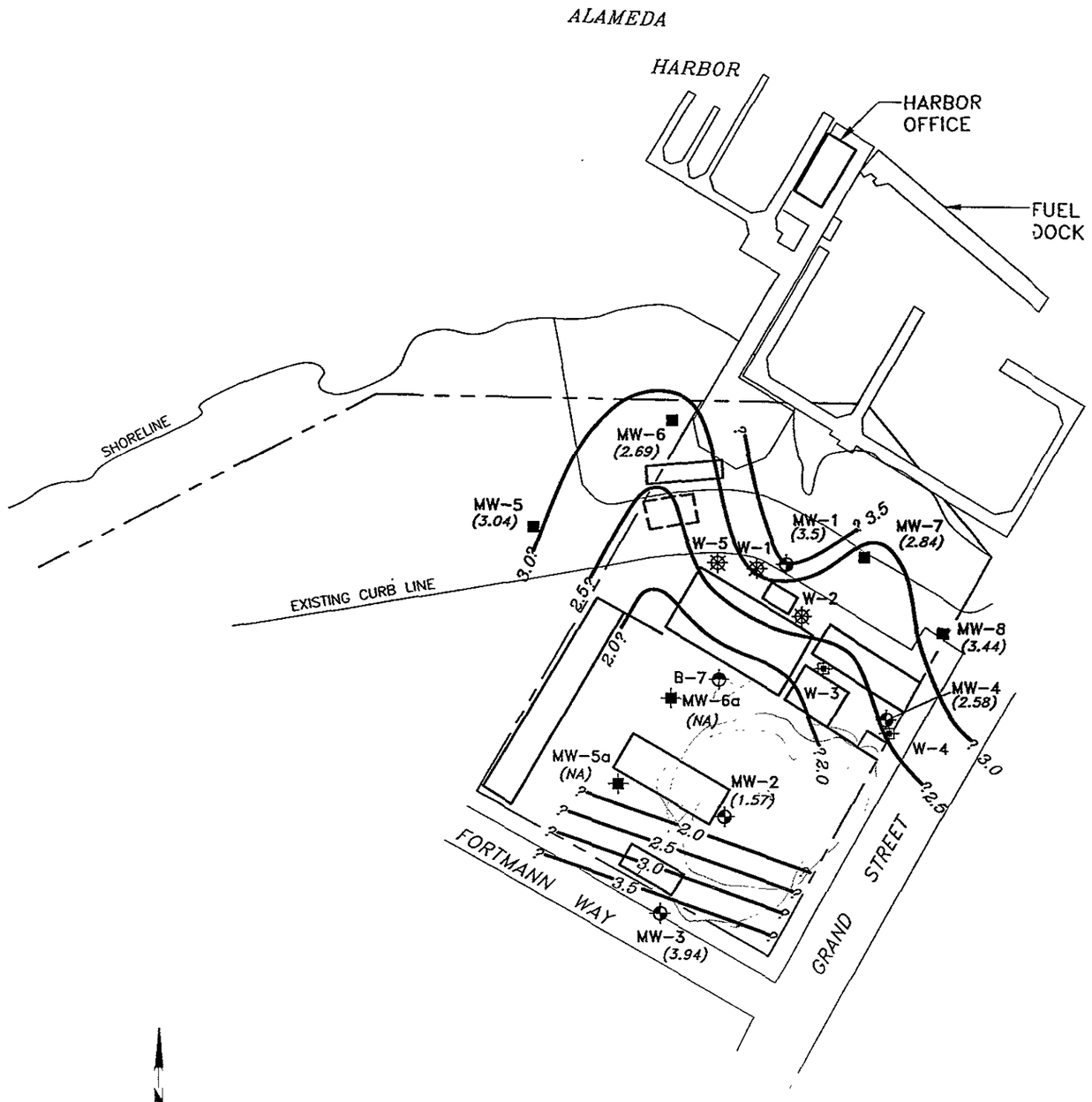
199501 161702 I:\JOBS\MARINA\MAFIOCT

SECOR INTERNATIONAL INCORPORATED

DRAWN	KN
APPR	JGR
DATE	16JAN95
JOB NO.	50085-001-01

FIGURE 7
GRAND MARINA FACILITY
ALAMEDA CALIFORNIA

GROUNDWATER ELEVATION CONTOURS-OCTOBER 31, 1994



LEGEND

MW-5a	MONITORING WELL (ACC, 10/94)
MW-8	MONITORING WELL (SECOR, 10/94)
MW-1	MONITORING WELL (ZACCOR, 5/92)
B-7	MONITORING WELL (HARDING-LAWSON, 6/87)
W-3	ABANDONED MONITORING WELL (CROWLEY ENVIRONMENTAL SERVICES, 4/87)
W-4	MONITORING WELL (CROWLEY, 4/87)
(3.04)	GROUNDWATER ELEVATION (FEET MSL)
(NA)	DATA NOT AVAILABLE
2.0	GROUNDWATER ELEVATION CONTOUR (FEET MSL)
	PROPERTY LINE

N

0 100 200
SCALE FEET

SOURCE: BASED ON SURVEY BY RON ARCHER, CIVIL ENGINEER INC., NOVEMBER 1994

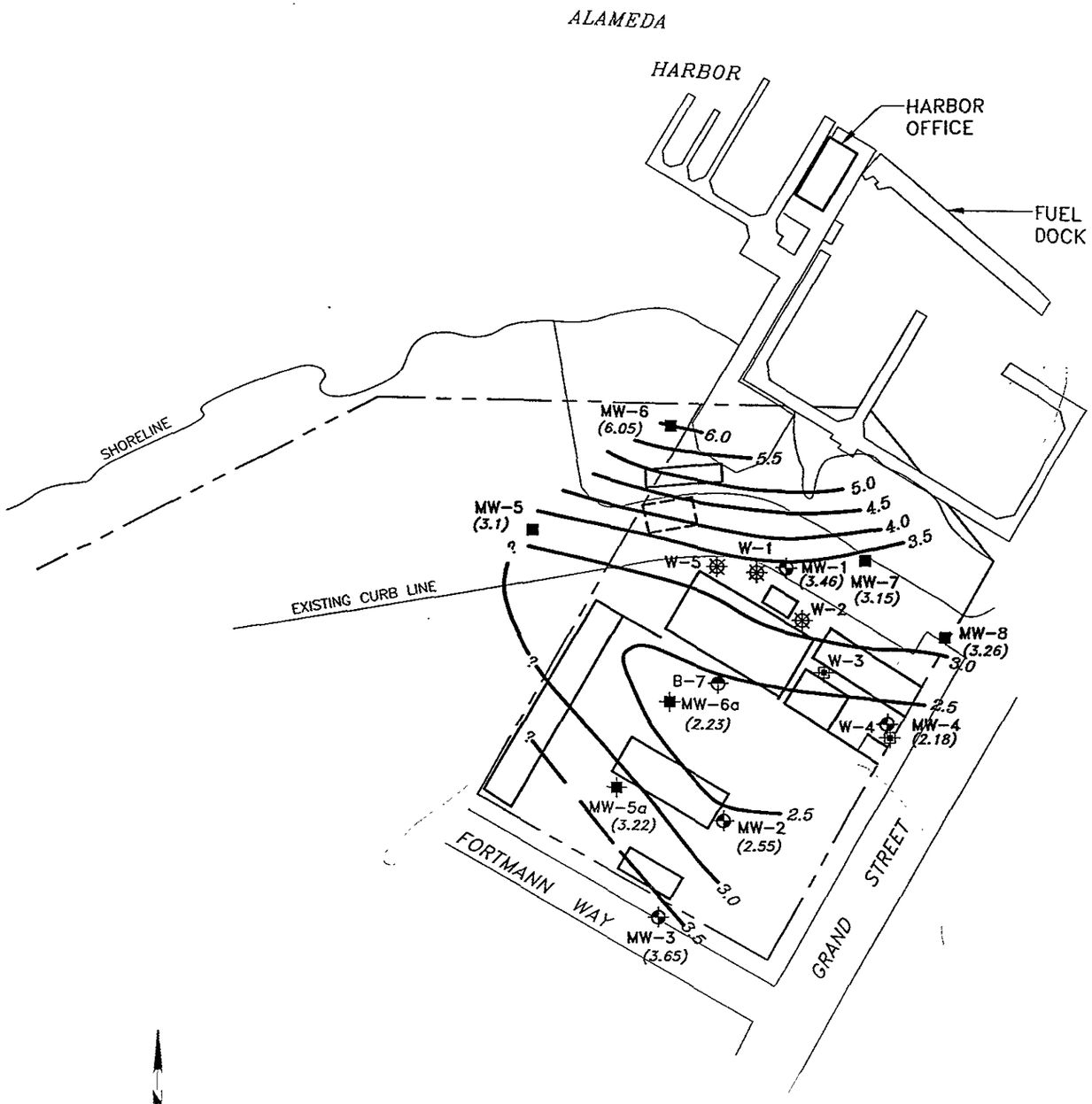
199501 161735 I:\JOBS\MARINA\MARINOV

SECOR INTERNATIONAL INCORPORATED

DRAWN	KN
APPR	JGR
DATE	16JAN95
JOB NO.	50085-001-01

FIGURE 8
GRAND MARINA FACILITY
ALAMEDA, CALIFORNIA

GROUNDWATER ELEVATION CONTOURS-NOVEMBER 30, 1994



LEGEND

MW-5a	MONITORING WELL (ACC, 10/94)
MW-8	MONITORING WELL (SECOR, 10/94)
MW-1	MONITORING WELL (ZACCOR, 5/92)
B-7	MONITORING WELL (HARDING-LAWSON, 6/87)
W-3	ABANDONED MONITORING WELL (CROWLEY ENVIRONMENTAL SERVICES, 4/87)
W-4	MONITORING WELL (CROWLEY, 4/87)
(3.22)	GROUNDWATER ELEVATION (FEET MSL)
3.0	GROUNDWATER ELEVATION CONTOUR (FEET MSL)
	PROPERTY LINE

N

0 100 200
SCALE FEET

SOURCE BASED ON SURVEY BY RON ARCHER, CIVIL ENGINEER INC., NOVEMBER 1994

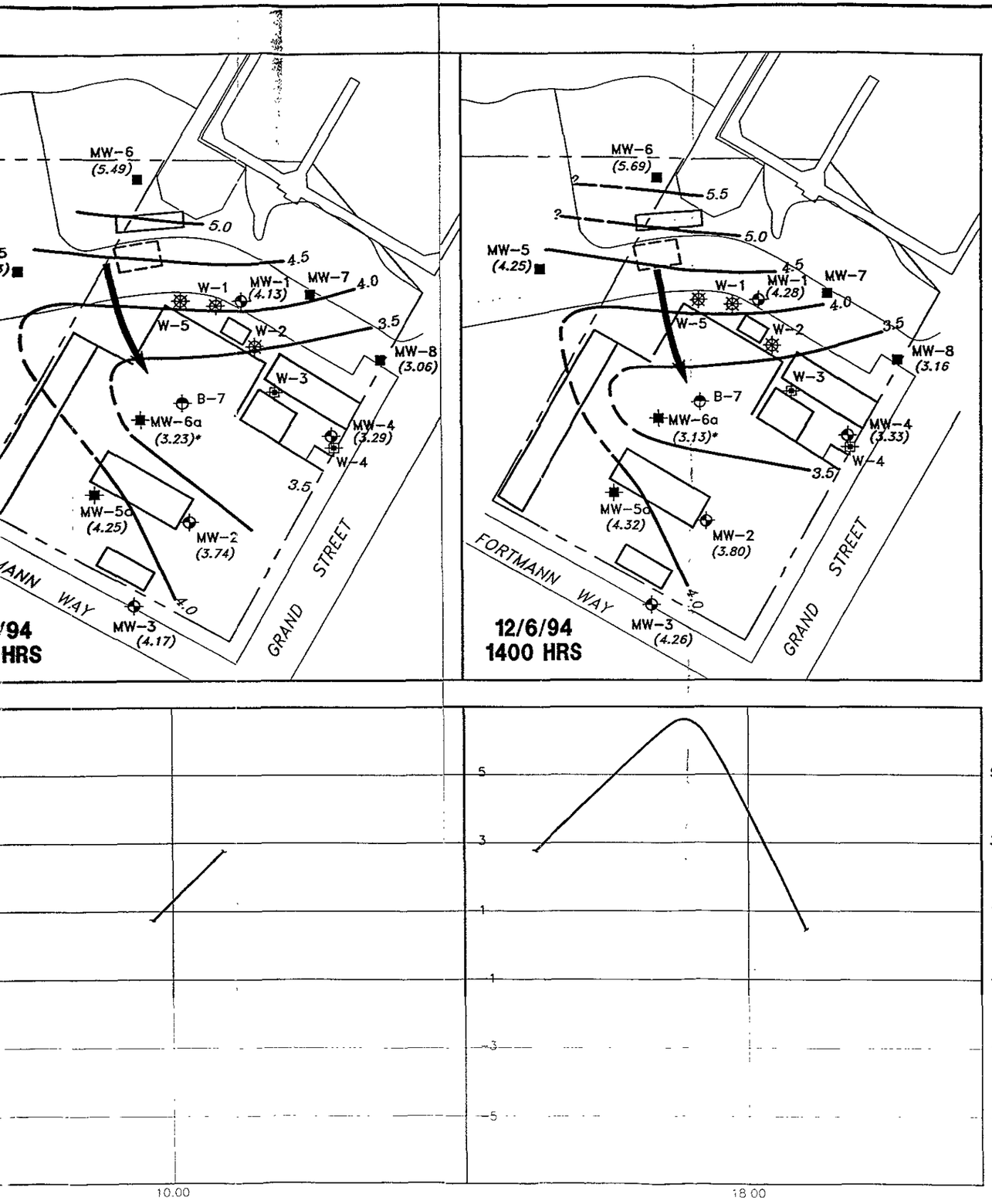
SECOR INTERNATIONAL INCORPORATED

DRAWN	KN
APPR	JGR
DATE	16JAN95
JOB NO	50085-001-01

FIGURE 9
GRAND MARINA FACILITY
ALAMEDA, CALIFORNIA

GROUNDWATER ELEVATION CONTOURS-DECEMBER 29, 1994

199501.161748 I:\JOBS\MARINA\MARIDEC



LEGEND

MW-5a	MONITORING WELL (ACC, 10/94)
MW-8	MONITORING WELL (SECOR, 10/94)
MW-1	MONITORING WELL (ZACCOR, 5/92)
B-7	MONITORING WELL (HARDING-LAWSON, 6/87)
W-3	ABANDONED MONITORING WELL (CROWLEY ENVIRONMENTAL SERVICES, 4/87)
W-4	MONITORING WELL (CROWLEY, 4/87)
(5.48)	GROUNDWATER ELEVATION (FEET MSL)
*	ELEVATION DATA EXTRAPOLATED
4.5	GROUNDWATER ELEVATION CONTOUR (FEET MSL)
	PROPERTY LINE

N

0 100 200

SCALE FEET

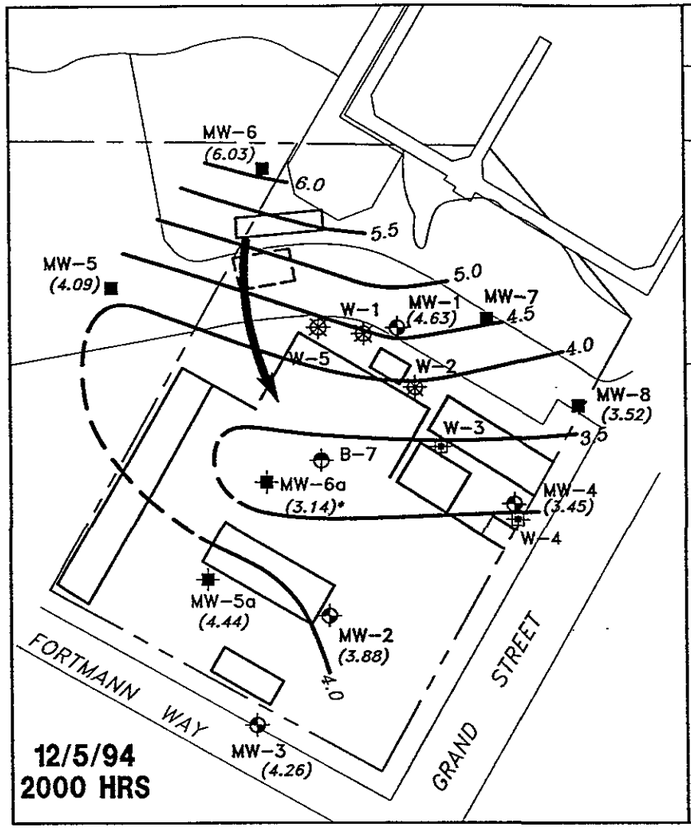
SOURCE. BASE ON RON ARCHER CIVIL ENGINEER INC NOVEMBER 1994

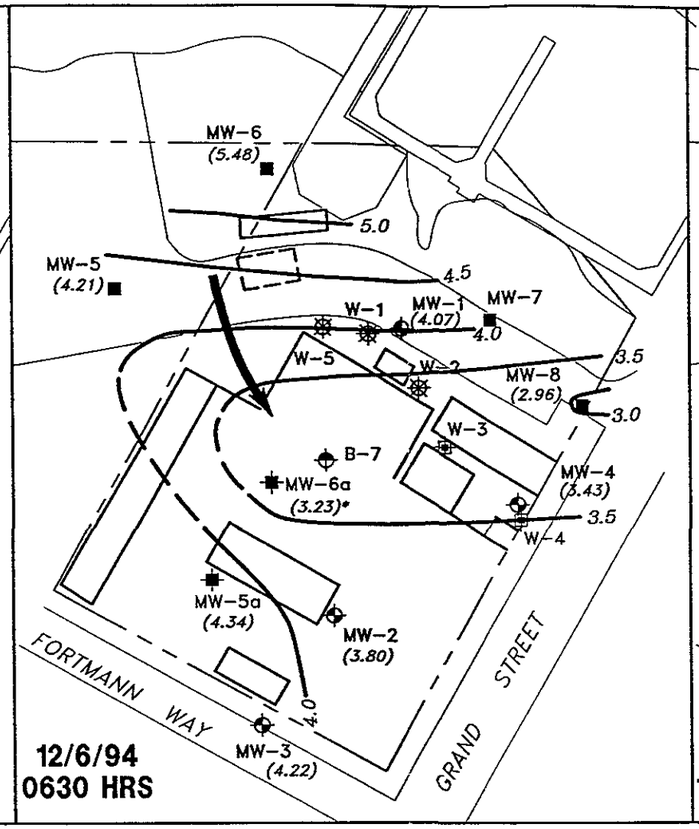
SECOR
INTERNATIONAL
INCORPORATED

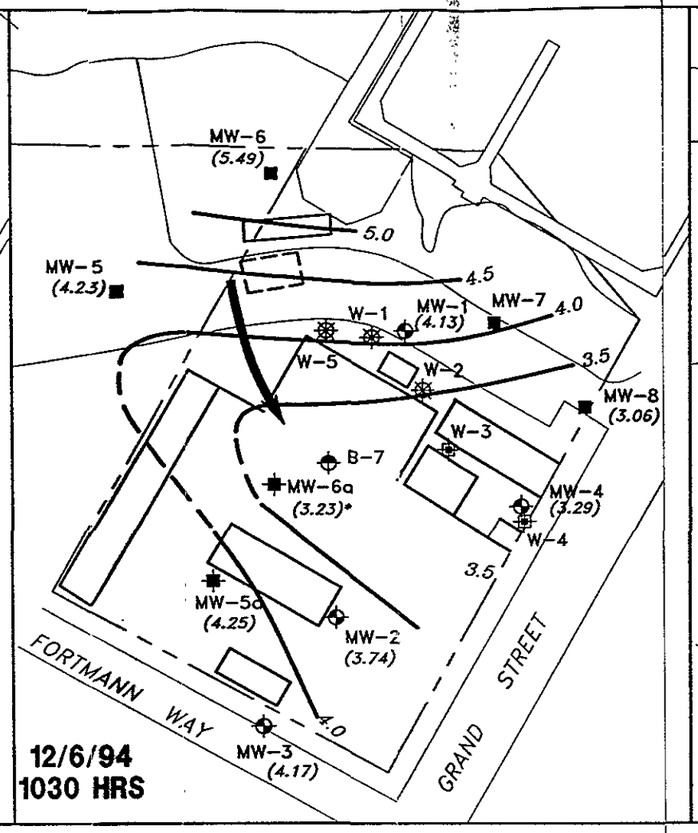
DRAWN	KN
APPR	JGR
DATE	16JAN95
JOB NO	50085-001-01

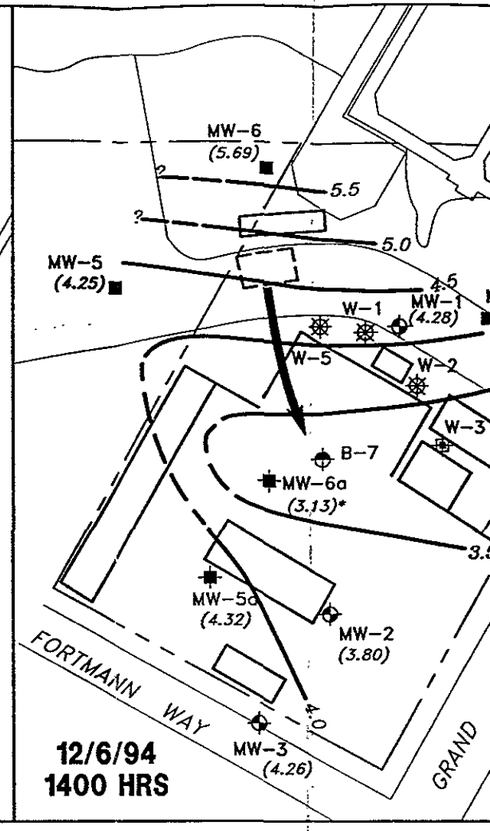
FIGURE 10
GRAND MARINA FACILITY
ALAMEDA CALIFORNIA

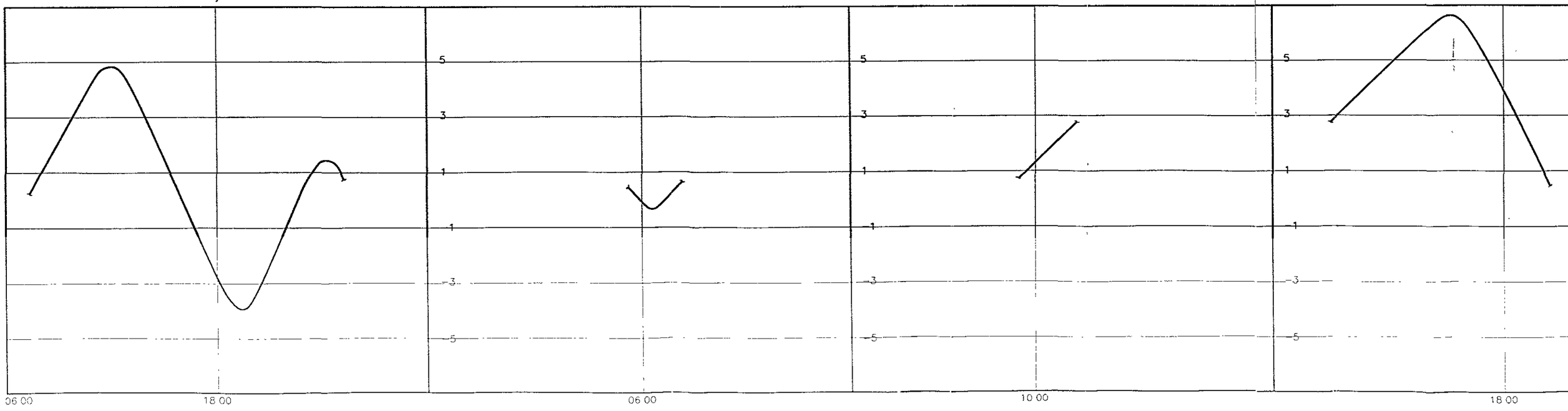
COMPARISON OF WATER ELEVATION DATA BETWEE MONITORING WELLS AND ALAMEDA HARBO DECEMBER 5 AND 6, 1994











APPENDIX A

HISTORICAL SOIL AND GROUNDWATER ANALYTICAL DATA

TABLE A1
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

SOILS - HYDROCARBONS

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
WELLBORES							
MW-1 4.0-4.5	ND	970	ND	ND	ND	ND	2,400
MW-1 10.0-10.5	NA	NA	NA	NA	NA	NA	NA
MW-1 15.0-15.5	NA	NA	NA	NA	NA	NA	NA
MW-2 4.0-4.5	19	150	0.24	0.62	0.050	0.26	57
MW-2 10.0-10.5	NA	NA	NA	NA	NA	NA	NA
MW-2 16.0-16.5	NA	NA	NA	NA	NA	NA	NA
MW-3 6.0-6.5	ND	ND	ND	ND	ND	ND	170
MW-3 10.0-10.5	NA	NA	NA	NA	NA	NA	NA
MW-4 10.0-10.5	NA	NA	NA	NA	NA	NA	NA
MW-4 15.0-15.5	NA	NA	NA	NA	NA	NA	NA
TANK FARM FLOOR							
#1 0.0-0.5	40	1,100	ND	ND	ND	0.13	1,300
#1 6.5-7.0	ND	99	ND	ND	ND	ND	220
#2 5.5-6.0	ND	36	ND	ND	ND	ND	130
#3 0.0-0.5	780	21,000	ND	0.55	0.88	3.0	15,000
#3 5.5-6.0	44	900	ND	ND	0.10	ND	1,800
#4 4.0-4.5	800	490	ND	ND	ND	1.2	1,900

TABLE A1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
#5 0.0-0.5	500	3,500	ND	ND	ND	ND	2,800
#5 5.5-6.0	12	40	0.024	0.14	0.075	0.23	200
#6 5.5-6.0	43	1,200*	ND	ND	ND	0.085	840
#7 0.0-0.5	97	960	ND	ND	0.13	0.54	2,100
#7 5.5-6.0	0.7	19*	0.006	ND	ND	0.009	190
#8 6.5-7.0	0.9	19*	ND	ND	ND	ND	120
#9 0.0-0.5	1.2	55	ND	ND	ND	0.010	320
#9 5.5-6.0	2.4	18*	ND	ND	ND	0.010	120
#10 5.5-6.0	ND	97	ND	ND	ND	ND	200
#11 0.0-0.5	320	12,000	ND	ND	ND	ND	4,000
#11 4.0-4.5	1.3	ND	ND	ND	ND	ND	90
#12 0.0-0.5	NA	NA	NA	NA	NA	NA	1,100
#12 6.5-7.0	ND	ND	ND	ND	ND	ND	100
TANK FARM PERIMETER - DISCRETE SAMPLES							
#15 0.0-0.5	28*	160*	ND	ND	ND	0.086	470
#19 4.5-5.0	ND	ND	ND	ND	ND	ND	340
#23X 3.0-3.5	ND	ND	ND	ND	ND	ND	37

TABLE A1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
#32A 0.0-0.5	ND	ND	ND	ND	ND	ND	57
#32B 4.0-4.5	ND	ND	ND	ND	ND	ND	110
#33B 4.0-4.5	ND	550*	ND	ND	ND	ND	5,500
#45B 4.0-4.5	230*	200	ND	0.081	0.66	1.9	3,500
#49B 4.0-4.5	1,200*	16,000	ND	1.2	0.74	1.9	1,300
#51B 4.0-4.5	0.9	24	ND	ND	ND	ND	87
TANK FARM PERIMETER - COMPOSITE SAMPLES							
#13,#14,#16 0.0-0.5	ND	250	ND	ND	ND	ND	1,100
#13,#14 4.5-5.0	ND	37*	ND	ND	ND	ND	330
#17-20 0.0-0.5	0.7	230*	ND	ND	ND	0.009	680
#18,#19,#20 4.5-5.0	ND	140*	ND	ND	ND	ND	680
#21-#24 0.0-0.5	0.9	180*	ND	ND	ND	0.013	1,500
#21-#24 4.5-5.0	ND	ND	ND	ND	ND	ND	130
#25-#28 0.0-0.5	0.7	1,300*	ND	ND	ND	ND	2,300
#25-#28 4.0-4.5	ND	ND	ND	ND	ND	ND	310
#29A-32A 0.0-0.5	ND	1,100*	ND	ND	ND	ND	690
#29,#30,#32B 4.0-4.5	ND	13	ND	ND	ND	ND	43

TABLE A1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
#33,35,#36A 0.0-0.5	ND	49*	ND	ND	ND	ND	310
#33-#36B 4.0-4.5	ND	460*	ND	ND	ND	ND	2,000
#37-#40A 0.0-0.5	ND	63*	ND	ND	ND	ND	220
#37-#40B 4.0-4.5	ND	910*	ND	ND	ND	ND	2,700
#41-#44A 0.0-0.5	ND	98*	ND	0.014	ND	0.014	850
#45,#47,#48A 0.0-0.5	0.7*	240*	ND	0.005	0.013	0.040	980
#45B,#48B 4.0-4.5	120*	110	ND	ND	0.23	0.30	1,200
#49A,#50A 0.0-0.5	ND	7,900	ND	ND	ND	ND	8,600
#49B,#50B 4.0-4.5	370*	11,000	ND	ND	ND	1.1	4,500
#51A,#52A 0.0-0.5	NA	110	NA	NA	NA	NA	400
#51B,#52B 4.0-4.5	ND	28	ND	ND	ND	ND	40
FORMER UST VICINITY							
TP1 4.0-4.5	340	660**	ND	0.87	1.0	2.1	2,000
TP2 4.0-4.5	88	NA	ND	0.54	0.34	0.59	350
TP3 4.0-4.5	17	NA	0.15	0.18	0.131	0.40	4,400
TP5 4.0-4.5	ND	NA	ND	ND	ND	ND	12,000
TP6 4.0-4.5	26	NA	ND	0.088	0.20	0.64	7,500

TABLE A1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
TP7 4.0-4.5	5.2	NA	ND	0.013	0.059	0.15	480
TP8 4.0-4.5	ND	82*	ND	ND	ND	ND	410
TP9 4.0-4.5	490*	4,700	ND	ND	ND	5.8	3,100
PRODUCT LINES							
PL-2 4.0-4.5	0.7*	5,400*	ND	ND	ND	ND	10,000
PL-3 4.0-4.5	ND	31*	ND	ND	ND	ND	560
PL-4 4.5-5.0	210*	11,000*	ND	ND	0.22	0.60	11,000
PL-12 4.5-5.0	ND	21*	ND	ND	ND	ND	37
1987 HLA BORINGS							
B-1 1.0-1.5	2,300(1)	NA	NA	NA	NA	NA	NA
B-2 5.0-5.5	NR	NR	NR	NR	NR	NR	NR
B-3 1.5-2.0	11(1)	NA	NA	NA	NA	NA	NA
B-4 5.0-5.5	ND	NA	NA	NA	NA	NA	NA
B-5 5.0-5.5	ND	NA	NA	NA	NA	NA	NA
B-6 1.5-2.0	53	NA	NA	NA	NA	NA	NA
B-7/W-1 11.5-12.0	NR	NR	NR	NR	NR	NR	NR
1987 HLA TRENCHES							
T-1	ND	ND	ND	ND	ND	ND	NA

TABLE A1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
T-2	ND	ND	ND	ND	ND	ND	NA
T-3	4(2)	ND	ND	ND	ND	ND	NA
T-4	ND	31,000	ND	130	6	20	NA
T-5	ND	ND	ND	0.6	1.2	6	NA
T-6	ND	ND	ND	ND	ND	ND	NA
URIAH TANK PIT SAMPLES							
#1	ND	ND	ND	ND	ND	ND	NA
#2	730	ND	0.3	0.3	0.7	ND	NA
AREA OF PREVIOUS B-1 BORING							
1B-1 1.0-1.5	NA	NA	NA	NA	NA	NA	ND
1B-1 4.0-4.5	NA	NA	NA	NA	NA	NA	NA
2B-1 1.0-1.5	NA	NA	NA	NA	NA	NA	30
2B-1 4.0-4.5	NA	ND	NA	NA	NA	NA	ND
3B-1 1.0-1.5	NA	ND	NA	NA	NA	NA	ND
3B-1 4.0-4.5	NA	ND	NA	NA	NA	NA	ND
4B-1 1.0-1.5	NA	ND	NA	NA	NA	NA	180
4B-1 4.0-4.5	NA	ND	NA	NA	NA	NA	50
5B-1 1.0-1.5	NA	ND	NA	NA	NA	NA	100
5B-1	NA	ND	NA	NA	NA	NA	ND
4.0-4.5	NA	ND	NA	NA	NA	NA	ND

TABLE A1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

SOILS - METALS

PARAMETERS	T-1	T-2	T-3	T-4	T-5
Beryllium	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	0.5
Chromium	26	22	21	32	21
Copper	11	4.6	62	73	100
Lead	21	8.9	840	140	190
Nickel	23	16	26	53	51
Silver	1.3	ND	ND	ND	ND
Thallium	ND	ND	ND	5.4	ND
Zinc	27	12	310	270	330
Antimony	21	20	ND	ND	ND
Arsenic	2.6	1.6	4.7	38	0.4
Selenium	ND	ND	ND	ND	ND
Mercury	0.07	0.03	0.13	0.26	0.17

TABLE 1 (Concluded)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

WATER SAMPLES - HYDROCARBONS

SAMPLE	DATE	TPHg	TPHd	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	TOG	FREE PRODUCT
MW-1	5/4/92	ND	ND	ND	0.8	ND	1.3	ND	None
MW-2	5/4/92	29,000	1,200	4,000	11,000	500	2,900	ND	None
MW-3	5/4/92	ND	120	ND	1.0	ND	ND	ND	None
MW-4	5/4/92	ND	150	ND	ND	ND	ND	ND	None
W-1(7)	6/12/87	36*	NA	0.0066	ND	0.013	ND	NA	0.25-0.50
W-2(7)	6/12/87	1.3*	NA	0.350	ND	0.023	0.018	NA	Sheen
W-3(7)	6/12/87	ND	NA	0.0041	ND	ND	ND	NA	None
W-4	6/12/87	ND	NA	ND	ND	ND	ND	NA	None
W-5	6/12/87	ND	NA	ND	ND	ND	ND	NA	Sheen
B-7	6/12/87	ND	NA	ND	ND	ND	ND	NA	None

WATER SAMPLES - METALS

SAMPLE	LEAD	ZINC
WELL B-7	0.14	NA
T-3	NA	2.7

NOTES: 1 - Soil analytical results in mg/kg unless otherwise noted.
2 - Groundwater analytical results in $\mu g/\ell$, except TOG which is reported in mg/ℓ.
3 - NA indicates not analyzed.
4 - ND indicates not detected above laboratory reporting limit.
5 - NR indicates results not reported.
6 - Reported by laboratory as TPHd* but possibly represents heavier hydrocarbon product. Those reported as TPHg* may possibly represent diesel or kerosene.
7 - Results in mg/ℓ.

TABLE A2
SOIL BORING CHEMICAL ANALYTICAL DATA[1]
Subsurface Investigation
2099 Grand Street
Alameda, California

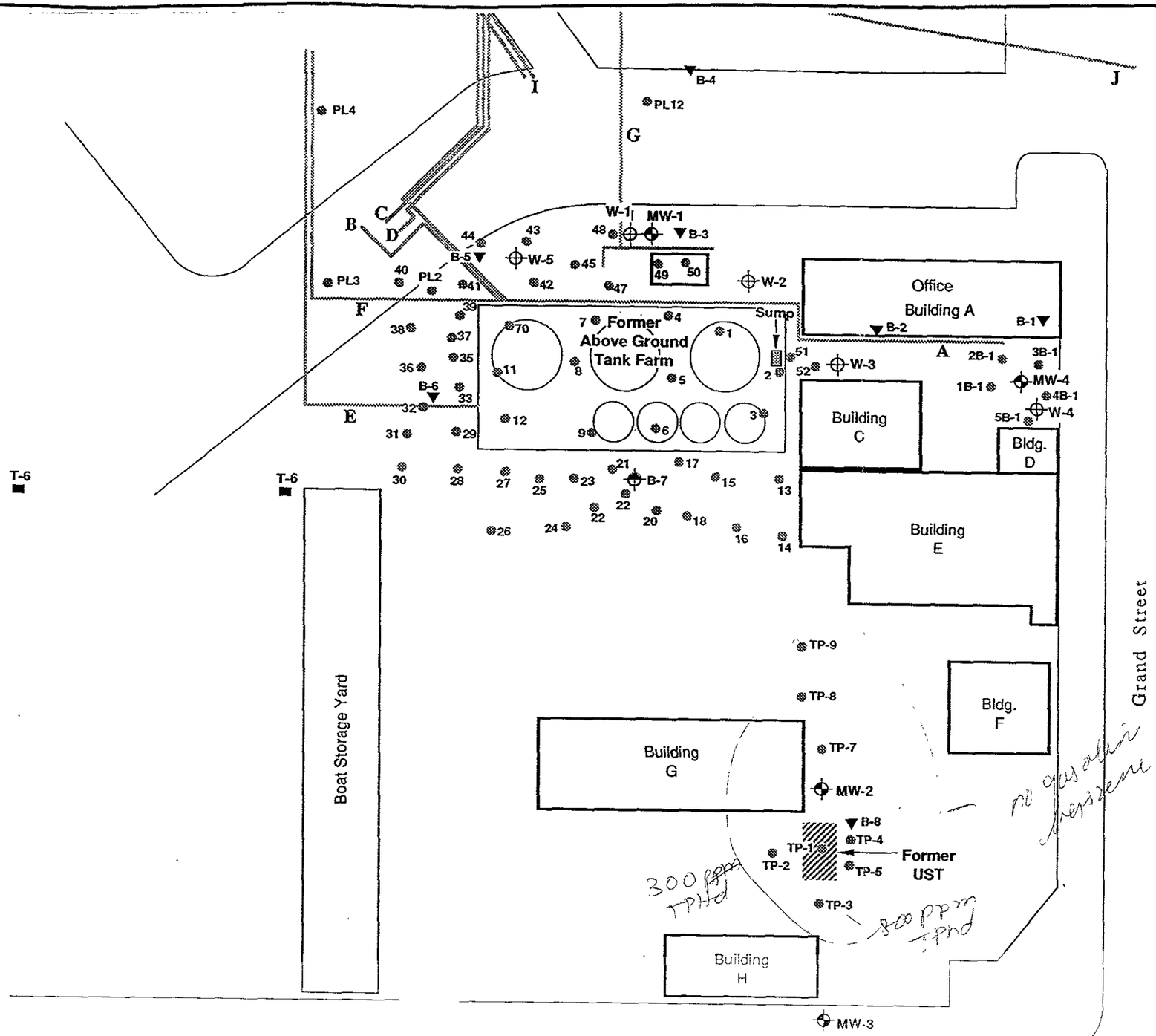
Sample[2] Depth	TPHd	TPHg	Benzene	Toulene	Ethyl Benzene	Xylenes
TP1-3.5	29	NA	NA	NA	NA	NA
TP2-4	300	NA	NA	NA	NA	NA
TP2A-4	<5.0	NA	NA	NA	NA	NA
TP2B-4	<5.0	NA	NA	NA	NA	NA
TP3-4	800	13	<0.005	<0.005	0.070	0.059
TP4-4	<5.0 (<5.0)	<1.0 (NA)	<0.005 (NA)	<0.005 (NA)	<0.005 (NA)	<0.005 (NA)
TP5-4	<5.0	<1.0	<0.005	<0.005	<0.005	<0.005
TP5A-4	<5.0	<1.0	<0.005	<0.005	<0.005	<0.005
HD1-5	15	NA	NA	NA	NA	NA
HD2-4	<5.0	NA	NA	NA	NA	NA
HD3-5	<5.0	NA	NA	NA	NA	NA
HD3A-4	<5.0	NA	NA	NA	NA	NA
HD4-3.5	<5.0	<1.0	<0.005	<0.005	<0.005	<0.005
PL1A-6.5	<5.0	NA	NA	NA	NA	NA
PL2-4	<5.0	NA	NA	NA	NA	NA
PL3-4	5.0	NA	NA	NA	NA	NA
PL4-4	<5.0	NA	NA	NA	NA	NA

(1) - Measured in milligrams per kilograms (mg/kg).
(2) - Boring number and depth to top of analyzed sample.
NA - Not Analyzed.
< - Analyte not detected above the noted reporting limit.
Duplicate results in parenthesis.
Note PL1A-6.5 is duplicate of PL1-3.5 - Primary sample not analyzed.

TABLE A3
GROUNDWATER CHEMICAL ANALYTICAL DATA
Subsurface Investigation
2099 Grand Street
Alameda, California

Borehole	TPHd[1]	TPHg[1]	Benzene[2]	Toulene[2]	Ethyl-Benzene[2]	Xylenes[2]
TP1	<50	NA	NA	NA	NA	NA
TP2	31,000 (15,000)	NA (NA)	NA (NA)	NA (NA)	NA (NA)	NA (NA)
TP2A	450,000	NA	NA	NA	NA	NA
TP2B	<50	NA	NA	NA	NA	NA
TP3	<50	<50	<0.5	<0.5	<0.5	<0.5
TP4	<50	<50	<0.5	<0.5	<0.5	<0.5
TP5	<50	<50	<0.5	<0.5	<0.5	<0.5
TP5A	<50	<50	<0.5	<0.5	<0.5	<0.5
HD3A	<50	NA	NA	NA	NA	NA
HD4	<50	<50	<0.5	1.6	5.3	4.5
PL1	<50	<50	<0.5	<0.5	<0.5	<0.5
PL2	630	NA	NA	NA	NA	NA
PL3	<50	NA	NA	NA	NA	NA
PL4	1,200	NA	NA	NA	NA	NA
Trip Blank	NA	<50	<0.5	<0.5	<0.5	<0.5

(1) - Measured in micrograms per liter ($\mu g/\ell$).
NA - Not Analyzed.
< - Analyte not reported above noted detection limit.
* - No sample obtained.
Duplicate results in parenthesis.
No samples collected from borings HD1 and HD3.



LEGEND

- Monitoring Well (Zaccor, 5/92)
- Soil Boring (Zaccor, 5/92)
- Monitoring Well (Harding-Lawson, 6/87)
- Soil Boring (Harding-Lawson, 6/87)
- Test Trench (Harding-Lawson, 6/87)
- Monitoring Well (Crowley Environmental Services, 4/87)

NOTE:
Locations are approximate and based on previous site plans.

KEY FOR UTILITIES

A	3" Commercial Diesel Line
B	Diesel Vent Line
C	Gasoline Line
D	Diesel Line
E	Abandoned Bilge/Sludge Line (4") — Proposed Secondary Pipe Enclosure Chase for Future Use
F	Abandoned Diesel Line (4") — Proposed Secondary Pipe Enclosure Chase for Future Use
G	Abandoned Lube Oil (3") — Proposed Secondary Pipe Enclosure Chase for Future Use
H	8" Concrete Storm Drain
I	3" Copper Pump-up Fire Hydrants
J	6" Sewer V.C.P.
K	2 x 3" High Voltage Electrical
L	4" Electrical Secondary
M	2 x 3" Telephone
N	2 x 2" Cable T.V.

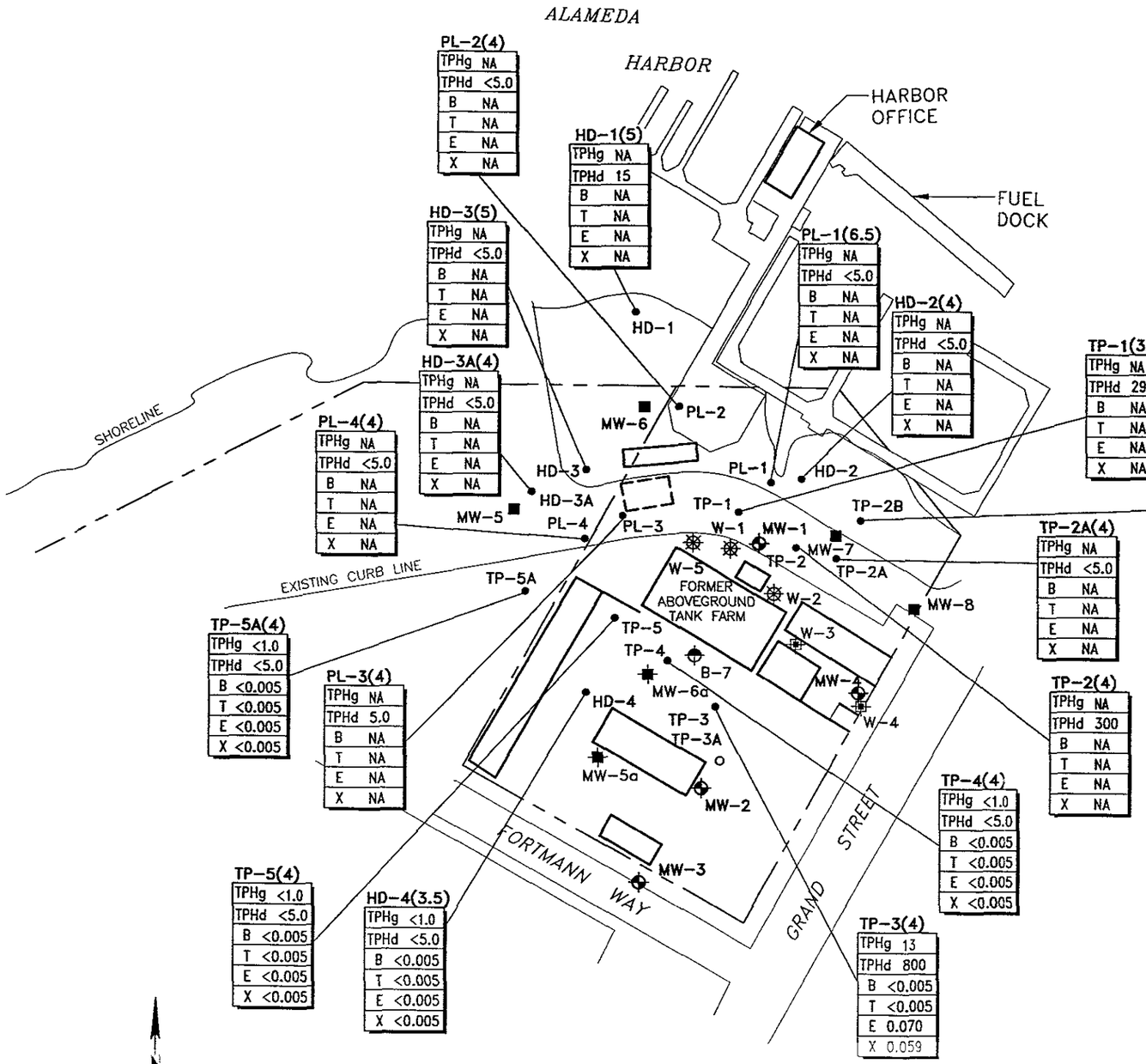
SECOR INTERNATIONAL INCORPORATED

DRAWN	
APPR	JGR
DATE	16JAN95
JOB NO	50085-001-01

FIGURE A1
GRAND MARINA FACILITY
ALAMEDA, CALIFORNIA

PREVIOUS SAMPLING LOCATIONS

I:\JOBS\MARINA\MAR1.SAMP 231603 199501



LEGEND

- MW-5a ✱ MONITORING WELL (ACC, 10/94)
- MW-8 ■ MONITORING WELL (SECOR, 10/94)
- TP-3A ○ BORING (SECOR, 10/94)
- PL-2 • BORING (SECOR, 10/93)
- MW-1 ⊕ MONITORING WELL (ZACCOR, 5/92)
- B-7 ⊕ MONITORING WELL (HARDING-LAWSON, 6/87)
- W-3 ✱ ABANDONED MONITORING WELL (CROWLEY ENVIRONMENTAL SERVICES, 4/87)
- W-4 ⊕ MONITORING WELL (CROWLEY, 4/87)
- — — — PROPERTY LINE

CHEMICAL ANALYTICAL RESULTS:

TP-1(3.5) — Boring Number (Sample Depth)

TPHg	NA — Not Analyzed
TPHd	300
B	<0.005
T	<0.005
E	<0.005 — Not Detected Above Laboratory Reporting Limit
X	<0.005

ANALYTES:

TPHg	Total Petroleum Hydrocarbons as Gasoline
TPHd	Total Petroleum Hydrocarbons as Diesel
B	Benzene
T	Toluene
E	Ethylbenzene
X	Xylenes

NOTE:

TPHg, TPHd, AND TOG CONCENTRATIONS MEASURED IN mg/kg.
BTEX CONCENTRATIONS MEASURED IN ug/kg.

SOURCE: BASED ON SURVEY BY RON ARCHER, CIVIL ENGINEER INC., NOVEMBER 1994

SECOR INTERNATIONAL INCORPORATED

DRAWN	KN
APPR	JGR
DATE	16JAN95
JOB NO	50085-001-01

FIGURE A2
GRAND MAR NA FACILITY
ALAMEDA, CALIFORNIA

SOIL CHEMICAL ANALYTICAL RESULTS-OCTOBER 27 AND 28, 1993

19501 2010 4 J:\JOBS\MARINA\MAR1SOIL

APPENDIX B

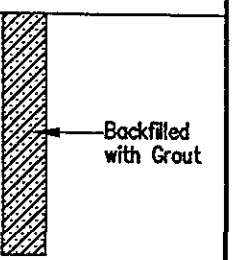
BORING LOGS AND WELL PERMIT

Project: SUBSURFACE INVESTIGATION		Project No.: 50085-001-01	Log of Boring/Monitoring Well: TP-3A
Boring Location: 2099 GRAND STREET, ALAMEDA			
Subcontractor and Equipment: BAYLAND		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE		Monitoring Device: OVM 580B	Comments: ABANDONED
Start Date/Time: 10/27/94//0900		Finish Date/Time: 10/27/94//1000	
First Water (bgs): 2.5'		Stabilized Water Level (bgs): NA	

Surface Elevation: NA Casing Top Elevation: NA

Sample Interval/ Recovery (Feet)	Sample I.D.	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
		6.1	0			BROWN SILTY SAND (SM) moist, medium dense to loose; pieces of asphalt (2,78,20,0)
18/18	TP3-2	7.8	2			DARK GRAY SILTY SAND (SM) wet, loose, slight organic odor (0,85,15,0)
		7.8	3			
18/18			4			DARK GRAY, CLAY (CL) with silt moist, stiff, high plasticity (0,0,10,90)
			5			End of Boring at 5'.
		11.4	6			

Boring Abandonment/ Well Construction Details



G:\KIM\GRDMARIN\TP3A

SECOR

Reviewed By James D Ritchie Date 1-26-95

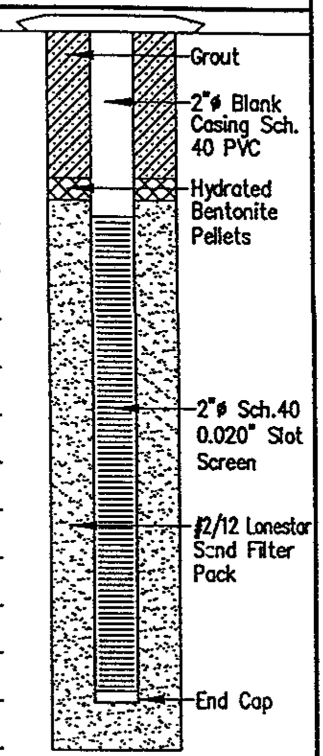
Revised By _____ Date _____

Project: SUBSURFACE INVESTIGATION	Project No.: 50085-001-01	Log of Boring/Monitoring Well: **MW-5**	
Boring Location: 2099 GRAND STREET, ALAMEDA			
Subcontractor and Equipment: BAYLAND	Logged By: TJPK		
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B	Comments:	
Start Date/Time: 10/26/94//1030	Finish Date/Time: 10/26/94//1130		
First Water (bgs): 7	Stabilized Water Level (bgs): 4.97		

Surface Elevation: 8.50 Casing Top Elevation: 8.26

Sample Interval/ Recovery (Feet)	Sample I.D.	PID (ppm)	Depth (Feet)	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
36/36		25.4, 23.6	0–1.3	YELLOWISH BROWN CLAYEY SAND (SC) with silt and gravel, dense, low plasticity, moist to wet (10,65,10,15)
	MW5-2.5		1.3–2.3	OLIVE GRAY GRAVELLY SILTY SAND (SW) trace clay, dense, no plasticity, slightly moist (20,55,20,5)
		25.4	2.3–3.9	OLIVE GRAY SANDY CLAY (CL) with shells, stiff, high plasticity, slightly moist to moist (0,20,0,80)
36/60	MW5-5		3.9–7	LIGHT BROWN SANDY GRAVEL (GP) with clay dense, no plasticity, slightly moist (60,30,0,10)
60/60		23.6, 23.6	7–12	DARK GRAY CLAY (CL) with sand, medium stiff to soft, high plasticity, moist to wet, moderate odor (0,10,0,90) grades softer grades with roots
		16.6	12–14	ORGANIC CLAY (OH) medium stiff, medium plasticity, moist, strong sulfur odor, abundant plant matterial (0,0,0,100)
18/18		55	14–15	BROWN PEAT (PT) moist to slightly moist, moderate to strong odor (0,0,0,100)
			15	End of Boring at 15'.

Boring Abandonment/ Well Construction Details



199409 021009 C:\LOGS\IPRS\20L

SECOR

Reviewed By [signature] Date 1-26-95

Revised By ________ Date ________

Project: SUBSURFACE INVESTIGATION	Project No.: 50085-001-01	Log of Boring/Monitoring Well:	
Boring Location: 20999 GRAND STREET, ALAMEDA		**MW-5A**	
Subcontractor and Equipment: BAYLAND	Logged By: TJPK		
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B	Comments:	
Start Date/Time: 10/26/94//0730	Finish Date/Time: 10/26/94//0815	ABANDONED	
First Water (bgs): 7	Stabilized Water Level (bgs): NA		

Surface Elevation: NA Casing Top Elevation: NA

Sample Interval/ Recovery (Feet)	Sample I.D.	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)	Boring Abandonment/ Well Construction Details
36/36		14.9, 18.4, 11.4	0–3	SC / SW		YELLOWISH BROWN CLAYEY SAND (SC) with silt and gravel, dense, low plasticity, moist to wet (10,65,10,15) OLIVE GRAY GRAVELLY SILTY SAND (SW) trace clay, dense, no plasticity, slightly moist (20,55,20,5) grades moist	Backfilled with Grout
24/54	MW5A-6	14.9	4–7	GP	▽ 7	LIGHT BROWN SANDY GRAVEL (GP) with clay, dense, no plasticity, slightly moist (60,30,0,10)	
60/60		18.6, 11.4	8–13	CL		DARK GRAY SILTY CLAY (CL) medium stiff to soft, high plasticity, moist to wet, slight to moderate odor (0,0,15,85) grades softer grades with roots	
60/60		13.1, 11.4	14–18.5	OH / PT		ORGANIC CLAY (OH) medium stiff, medium plasticity, moist, strong organic odor, abundant roots and plant matter (0,0,0,100) BROWN PEAT (PT) moist, moderate odor, abundant plant material	
			19			End of Boring at 18.5'.	

Depth scale: 0–30 feet

199409 021009 C:\LOGS\TIPRS\20L

SECOR

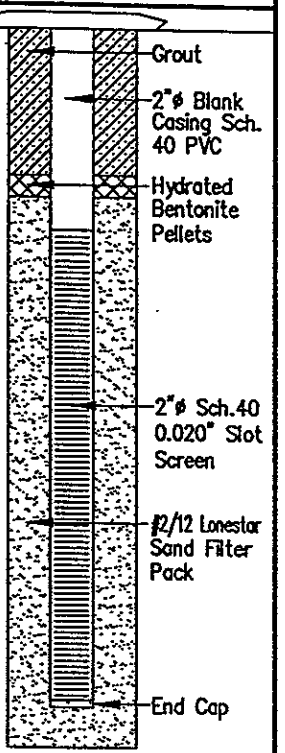
Reviewed By: [signature] Date: 1-26-95

Project: SUBSURFACE INVESTIGATION		Project No.: 50085-001-01	Log of Boring/Monitoring Well: MW-6
Boring Location: 2099 GRAND STREET, ALAMEDA			
Subcontractor and Equipment: BAYLAND		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE		Monitoring Device: OVM 580B	Comments:
Start Date/Time: 10/26/94//0845		Finish Date/Time: 10/26/94//1000	
First Water (bgs): 7		Stabilized Water Level (bgs): 5.17	

Surface Elevation: 8.51 Casing Top Elevation: 8.14

Sample Interval/ Recovery (Feet)	Sample I.D.	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
			0			YELLOWISH BROWN COARSE SAND (SP) trace with silt and clay, medium dense to loose, dry (5,85,5,5)
		14.9	1			
			2			OLIVE GRAY FINE SANDY SILT (ML) with gravel, medium plasticity, gravel angular to subangular, moist, slight hydrocarbon odor (10,40,50,0)
36/36	MW6-2.5		3			
			4			LIGHT BROWN GRAVELLY COARSE SAND (SP) trace clay, moist, very dense (20,75,0,5)
		18.4	5			
48/60			6			LIGHT GRAY SILTY FINE SAND (SM) trace clay, medium dense, no plasticity, dry, roots (0,80,15,5) grades dark gray and wet
		14.9	7			
			8			
		16	9			grades with more clay and black mottling
			10			DARK GRAY SILTY CLAY (CL) with abundant plant matter, soft high plasticity, moist, moderate sulfur odor (0,0,15,85) grades with less organics
60/60		16	11			
			12			
			13			BROWN PEAT (PT) some clay, soft, no plasticity, moist, strong sulfur odor (0,0,0,100)
18/18		10	14			
			15			End of Boring at 15'.
			16			
			17			
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			
			30			

Boring Abandonment/ Well Construction Details



199409 021009 C:\LOGS\HPRS\20L

SECOR

Reviewed By: Jim S Ritchie Date: 1-26-95

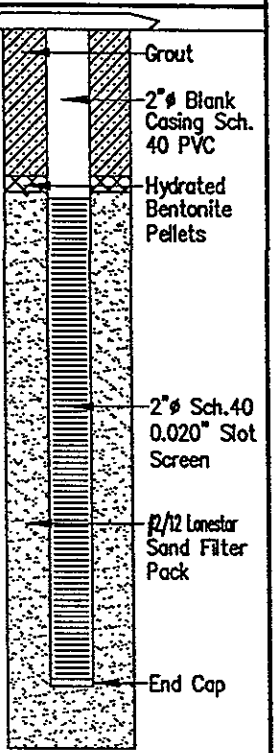
Revised By: _____ Date: _____

Project: SUBSURFACE INVESTIGATION		Project No.: 50085-001-01	Log of Boring/Monitoring Well: MW-7
Boring Location: 2099 GRAND STREET, ALAMEDA			
Subcontractor and Equipment: BAYLAND		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE		Monitoring Device: OVM 580B	Comments:
Start Date/Time: 10/26/94//1400		Finish Date/Time: 10/26/94//1530	
First Water (bgs): 4'		Stabilized Water Level (bgs): 3.16	

Surface Elevation: 6.32 Casing Top Elevation: 5.91

Sample Interval/ Recovery (Feet)	Sample I.D.	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
			0			
		18.4	1			YELLOWISH BROWN SANDY GRAVEL (GP) very dense, slightly moist (60,40,0,0)
36/36	MW7-2		2			
		9.6	3			
		104	4			LIGHT GRAY SANDY GRAVEL (GP) very dense, moist (60,40,0,0)
			5			DARK GRAY SILTY FINE SAND (SM) very loose, wet, slight to medium hydrocarbon odor (0,60,40;0)
60/60		29	6			DARK GRAY CLAY (CL) with silt and sand, stiff, high plasticity, moist (0,10,10,80)
			7			
			8			
			9			
60/60		27	10			
			11			grades with abundant roots
			12			
			13			
			14			BROWN PEAT (PT)
18/18		53	15			End of Boring at 15'.
			16			
			17			
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			
			30			

Boring Abandonment/ Well Construction Details



199409.021009 C:\LOGS\WPRS\204

SECOR

Reviewed By James D Ritchie Date 1-26-95

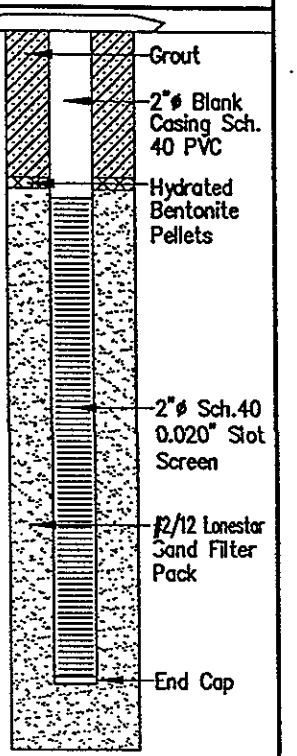
Revised By _____ Date _____

Project: SUBSURFACE INVESTIGATION		Project No.: 50085-001-01	Log of Boring/Monitoring Well: MW-8
Boring Location: 2099 GRAND STREET, ALAMEDA			
Subcontractor and Equipment: BAYLAND		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments:
Start Date/Time: 10/26/94//1220	Finish Date/Time: 10/26/94//1330		
First Water (bgs): 4'	Stabilized Water Level (bgs): 1.73		

Surface Elevation: 5.98 Casing Top Elevation: 5.65

Sample Interval/ Recovery (Feet)	Sample I.D.	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
			0			YELLOWISH BROWN SANDY GRAVEL (GP) very dense, slightly moist (60,40,0,0)
12/36			2			LIGHT GRAY SANDY GRAVEL (GP) very dense, moist (60,40,0,0)
	MW8-3.5	9.6	3			
		106	4			DARK GRAY SILTY FINE SAND (SM), very loose, wet, medium to strong odor (0,60,40,0)
60/60		184	5			DARK GRAY CLAY (CL) with silt and sand, stiff, high plasticity, moist to wet (0,10,10,80)
			6			
			7			
			8			grades with abundant roots
			9			
60/60			10			
			11			
			12			
			13			
			14			BROWN PEAT (PT)
		16.4	15			End of Boring at 15'.
			16			
			17			
			18			
			19			
			20			
			21			
			22			
			23			
			24			
			25			
			26			
			27			
			28			
			29			
			30			

Boring Abandonment/ Well Construction Details



199409 021009 C:\LOGS\HPRS\20L

SECOR

Reviewed By: James J. Peterson Date: 1-26-95

Revised By: _____ Date: _____

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT Grand Marina Facility
2099 Grand street
Alameda, CA

CLIENT
Name Crowley/Grand Marina
Address 2099 Grand Street Voice
City Alameda, CA Zip 94501

APPLICANT
Name SECOR
90 New Montgomery St Fax (415) 882-4406
Address Suite 620 Voice (415) 882-1548
City San Francisco, CA Zip 94105

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection		General	
Water Supply		Contamination	
Monitoring	X	Well Destruction	

PROPOSED WATER SUPPLY WELL USE

Domestic		Industrial		Other	
Municipal		Irrigation			

DRILLING METHOD:

Mud Rotary		Air Rotary		Auger	X
Cable		Other			

DRILLER'S LICENSE NO. 374162

WELL PROJECTS

Drill Hole Diameter	10	in.	Maximum		
Casing Diameter	2	in.	Depth		ft.
Surface Seal Depth		ft.	Number	5	

GEOTECHNICAL PROJECTS

Number of Borings			Maximum		
Hole Diameter		In	Depth		ft.

ESTIMATED STARTING DATE October 3, 1994
ESTIMATED COMPLETION DATE October 17, 1994

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68

APPLICANT'S

FOR OFFICE USE

PERMIT NUMBER 94608
LOCATION NUMBER

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 23 Sep 94
Wyman Hong

APPENDIX C

WATER SAMPLE DATA SHEETS

SEACOR
WATER SAMPLE FIELD DATA SHEET

PROJECT NO: Crowley GM
PURGED BY: CE
SAMPLED BY: CE

WELL ID: MW-1
SAMPLE ID: MW-1
CLIENT NAME:
LOCATION:

TYPE: Groundwater ✓ Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ✓ 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION: (feet/MSL):		VOLUME IN CASING (gal.)	1.80
DEPTH TO WATER (feet):	3.70	CALCULATED PURGE (gal.)	18
DEPTH OF WELL (feet):	14.94	ACTUAL PURGE VOL. (gal.)	8

DATE PURGED: 10/31/94 Start (2400 Hr) 15:25 End (2400 Hr.) 15:41
DATE SAMPLED: 10/31/94 Start (2400 Hr) ____ End (2400 Hr.) 19:20

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, X-DUP-1): MW-11 (19:25)

FIELD MEASUREMENTS

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (umhos/cm@25°C) x 1000	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (NTU)
15:25	3	7.10	Over Limit	71.4	Tan	High
15:37	6	7.73	" ✓	68.0	"	"
15:41	8	7.15	" ✓	67.1	"	✓

D.O. (ppm): ____ COLOR, COBALT (0-100): ____

Clear
Cloudy
Yellow
Brown

ODOR: Bad Smell

PURGING EQUIPMENT

___	2" Bladder Pump	___	Bailer(Teflon®)
___	Centrifugal Pump	X	Bailer (PVC)
___	Submersible Pump	___	Bailer (Stainless Steel)
___	Well Wizard™	___	Dedicated

Other: ____

SAMPLING EQUIPMENT

___	2" Bladder Pump	___	Bailer(Teflon®)
___	DDL Sampler	X	Bailer (PVC/disposable)
___	Submersible Pump	___	Bailer (Stainless Steel)
___	Well Wizard™	___	Dedicated

Other: ____

WELL INTEGRITY: ____ LOCK #: ____

REMARKS: Slow Recovery

SIGNATURE: CE

SEACOR
WATER SAMPLE FIELD DATA SHEET

PROJECT NO: Crowley GM
PURGED BY: ACC
SAMPLED BY: LT / SECOR

WELL ID: MW-2
SAMPLE ID: MW-2
CLIENT NAME:
LOCATION:

TYPE: Groundwater ✓ Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ✓ 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION: (feet/MSL):		VOLUME IN CASING (gal.)	
DEPTH TO WATER (feet):	2.60	CALCULATED PURGE (gal.)	
DEPTH OF WELL (feet):	15.09	ACTUAL PURGE VOL. (gal.)	

DATE PURGED: ____ Start (2400 Hr) ____ End (2400 Hr.) ____
DATE SAMPLED: 10/31/94 Start (2400 Hr) ____ End (2400 Hr.) 12:15

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, X-DUP-1): ____

FIELD MEASUREMENTS

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (NTU)

D.O. (ppm): ____ COLOR, COBALT (0-100): ____

Clear
Cloudy
Yellow
Brown

ODOR: ____

PURGING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	Centrifugal Pump	____	Bailer (PVC)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

SAMPLING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	DDL Sampler	X	Bailer (PVC/disposable)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

WELL INTEGRITY: ____ LOCK #: ____
REMARKS: ____

SIGNATURE: ____ Page 6 of 6

SEACOR
WATER SAMPLE FIELD DATA SHEET

PROJECT NO: Crowley GM
PURGED BY: A. [illegible]
SAMPLED BY: [illegible] (SEACOR)

WELL ID: [illegible]
SAMPLE ID: [illegible]
CLIENT NAME: _____
LOCATION: _____

TYPE: Groundwater ✓ Surface Water _____ Treatment Effluent _____ Other _____

CASING DIAMETER (inches): 2 ✓ 3 _____ 4 _____ 4.5 _____ 6 _____ Other _____

CASING ELEVATION: (feet/MSL):		VOLUME IN CASING (gal.)	
DEPTH TO WATER (feet):	4.76	CALCULATED PURGE (gal.)	
DEPTH OF WELL (feet):	15.06	ACTUAL PURGE VOL. (gal.)	

DATE PURGED: _____ Start (2400 Hr) _____ End (2400 Hr.) _____
DATE SAMPLED: 10/31/96 Start (2400 Hr) _____ End (2400 Hr.) [illegible]

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, X-DUP-1): _____

FIELD MEASUREMENTS

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (umhos/cm@25°C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (NTU)

D.O. (ppm): _____ COLOR, COBALT (0-100): _____

Clear
Cloudy
Yellow
Brown

ODOR: _____

PURGING EQUIPMENT

___	2" Bladder Pump	___	Bailer(Teflon®)
___	Centrifugal Pump	___	Bailer (PVC)
___	Submersible Pump	___	Bailer (Stainless Steel)
___	Well Wizard™	___	Dedicated

Other: _____

SAMPLING EQUIPMENT

___	2" Bladder Pump	___	Bailer(Teflon®)
___	DDL Sampler	X	Bailer (PVC/disposable)
___	Submersible Pump	___	Bailer (Stainless Steel)
___	Well Wizard™	___	Dedicated

Other: _____

WELL INTEGRITY: _____ LOCK #: _____
REMARKS: _____

SIGNATURE: [illegible] Page 1 of 2

SEACOR
WATER SAMPLE FIELD DATA SHEET

PROJECT NO: Crowley GM
PURGED BY: CZ
SAMPLED BY: CZ

WELL ID: MW-4
SAMPLE ID: MW-4
CLIENT NAME:
LOCATION:

TYPE: Groundwater ✓ Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ✓ 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION: (feet/MSL):		VOLUME IN CASING (gal)	1.94
DEPTH TO WATER (feet):	3.00	CALCULATED PURGE (gal)	19
DEPTH OF WELL (feet):	15.10	ACTUAL PURGE VOL. (gal)	9.5

DATE PURGED: 10/31/94 Start (2400 Hr) 14:22 End (2400 Hr.) 14:52
DATE SAMPLED: 10/31/94 Start (2400 Hr) ____ End (2400 Hr.) 18:40

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, X-DUP-1): ____

FIELD MEASUREMENTS

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (umhos/cm@25°C) X1000	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (NTU)
14:22	3	7.80	11.41	74.6	Tan	Hi≤6
14:30	6	7.96	14.43	69.5	"	"
14:37	6.5	7.21	16.30	69.3	"	"
14:42	8.0	7.49	17.01	67.0	"	"
14:52	9.5	7.50	17.69	64.6	"	"

D.O. (ppm): ____ COLOR, COBALT (0-100): ____

Clear
Cloudy
Yellow
Brown

ODOR: Smell like gas

PURGING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	Centrifugal Pump	X	Bailer (PVC)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

SAMPLING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	DDL Sampler	X	Bailer (PVC/disposable)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

WELL INTEGRITY: ____ LOCK #: ____

REMARKS: Well Recovery

SIGNATURE: CZ

SEACOR
WATER SAMPLE FIELD DATA SHEET

PROJECT NO: Conley GM
PURGED BY: CZ1
SAMPLED BY: CZ

WELL ID: MW 1
SAMPLE ID: MW-1
CLIENT NAME:
LOCATION:

TYPE: Groundwater ✓ Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ✓ 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION: (feet/MSL):		VOLUME IN CASING (gal.)	1.28
DEPTH TO WATER (feet):	5.76	CALCULATED PURGE (gal.)	12.27
DEPTH OF WELL (feet):	17.71	ACTUAL PURGE VOL. (gal.)	8 1/2

DATE PURGED: 10/21/94 Start (2400 Hr) 11:37 End (2400 Hr.) 12:00
DATE SAMPLED: 10/21/94 Start (2400 Hr) ____ End (2400 Hr.) 12:29

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, X-DUP-1): ____

FIELD MEASUREMENTS

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm@25°C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (NTU)
			x1000			
11:37	4.0	7.75	10.12	63.3	Tan	11.6
11:51	5.5	7.34	9.98	26.1	"	"
11:59	7.0	7.39	10.89	26.0	"	"

D.O. (ppm): ____ COLOR, COBALT (0-100): ____

Clear
Cloudy
Yellow
Brown

ODOR: ____

PURGING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	Centrifugal Pump	X	Bailer (PVC)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

SAMPLING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	DDL Sampler	X	Bailer (PVC/disposable)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

WELL INTEGRITY: ____ LOCK #: ____

REMARKS: ____

SIGNATURE: CZ Page 1 of 1

SEACOR
WATER SAMPLE FIELD DATA SHEET

PROJECT NO: Crowley GM
PURGED BY: LZ
SAMPLED BY: LZ

WELL ID: MW-6
SAMPLE ID: MW-6
CLIENT NAME:
LOCATION:

TYPE: Groundwater ✓ Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ✓ 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION: (feet/MSL):		VOLUME IN CASING (gal.)	1.31
DEPTH TO WATER (feet):	6.06	CALCULATED PURGE (gal.)	13.1
DEPTH OF WELL (feet):	14.24	ACTUAL PURGE VOL. (gal.)	8.5

DATE PURGED: 10/29/96 Start (2400 Hr) 12:50 End (2400 Hr.) 13:06
DATE SAMPLED: 10/29/96 Start (2400 Hr) ____ End (2400 Hr.) ____

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, X-DUP-1): ____

FIELD MEASUREMENTS

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm@25°C) X 1000	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (NTU)
12:50	4.5	7.81	17.81	82.2	TAN	High
13:00	5.5	7.50	17.47	77.3	"	"
13:06	7.0	7.63	17.24	75.0	"	"

D.O. (ppm): ____ COLOR, COBALT (0-100): ____

Clear
Cloudy
Yellow
Brown

ODOR: ____

PURGING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	Centrifugal Pump	X	Bailer (PVC)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

SAMPLING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	DDL Sampler	X	Bailer (PVC/disposable)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

WELL INTEGRITY: ____ LOCK #: ____

REMARKS: Slow recovery

SIGNATURE: LZ

SEACOR
WATER SAMPLE FIELD DATA SHEET

PROJECT NO: Crowley GM
PURGED BY: CT
SAMPLED BY: CT

WELL ID: MW-7
SAMPLE ID: MW-7
CLIENT NAME:
LOCATION:

TYPE: Groundwater ✓ Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ✓ 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION: (feet/MSL):		VOLUME IN CASING (gal.)	1.55
DEPTH TO WATER (feet):	3.86	CALCULATED PURGE (gal.)	15.5
DEPTH OF WELL (feet):	13.54	ACTUAL PURGE VOL. (gal.)	8

DATE PURGED: 10/31/94 Start (2400 Hr) 16:13 End (2400 Hr.) 16:28
DATE SAMPLED: 10/31/94 Start (2400 Hr) ____ End (2400 Hr.) 19:01

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, X-DUP-1): ____

FIELD MEASUREMENTS

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm@25°C) x 1000	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (NTU)
16:13	3	8.34	Over Limit	70.3	Tan	High
16:18	5	7.81	"	69.2	"	"
16:28	8	7.82	"	67.4	"	"

D.O. (ppm): ____ COLOR, COBALT (0-100): ____

Clear
Cloudy
Yellow
Brown

ODOR: Bad Smell

PURGING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	Centrifugal Pump	X	Bailer (PVC)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

SAMPLING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	DDL Sampler	X	Bailer (PVC/disposable)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

WELL INTEGRITY: ____ LOCK #: ____

REMARKS: slow Recovery

SIGNATURE: CT Page 1 of 1

SEACOR
WATER SAMPLE FIELD DATA SHEET

PROJECT NO: Crowley GM
PURGED BY: LT
SAMPLED BY: LT

WELL ID: MW-8
SAMPLE ID: MW-8
CLIENT NAME:
LOCATION:

TYPE: Groundwater ✓ Surface Water ____ Treatment Effluent ____ Other ____

CASING DIAMETER (inches): 2 ✓ 3 ____ 4 ____ 4.5 ____ 6 ____ Other ____

CASING ELEVATION: (feet/MSL):		VOLUME IN CASING (gal.)	1.53
DEPTH TO WATER (feet):	3.92	CALCULATED PURGE (gal.)	15.3
DEPTH OF WELL (feet):	13.50	ACTUAL PURGE VOL. (gal.)	8.5

DATE PURGED: 10/31/94 Start (2400 Hr) 16:57 End (2400 Hr.) 17:10
DATE SAMPLED: 10/31/94 Start (2400 Hr) ____ End (2400 Hr.) 18:30

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, X-DUP-1): ____

FIELD MEASUREMENTS

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (umhos/cm@25°C) X/000	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (NTU)
16:53	3	8.22	11.11	67.7	Tan	High
16:59	6	7.73	12.88	67.1	"	"
17:02	6.5	7.46	14.17	68.1	"	"
17:07	7.5	7.10	15.58	67.4	"	"
17:10	8.5	7.24	16.04	66.0	"	"

D.O. (ppm): ____ COLOR, COBALT (0-100): ____

ODOR: ____

Clear
Cloudy
Yellow
Brown

PURGING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	Centrifugal Pump	V	Bailer (PVC)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

SAMPLING EQUIPMENT

____	2" Bladder Pump	____	Bailer(Teflon®)
____	DDL Sampler	X	Bailer (PVC/disposable)
____	Submersible Pump	____	Bailer (Stainless Steel)
____	Well Wizard™	____	Dedicated

Other: ____

WELL INTEGRITY: ____ LOCK #: ____

REMARKS: Slow Recovery

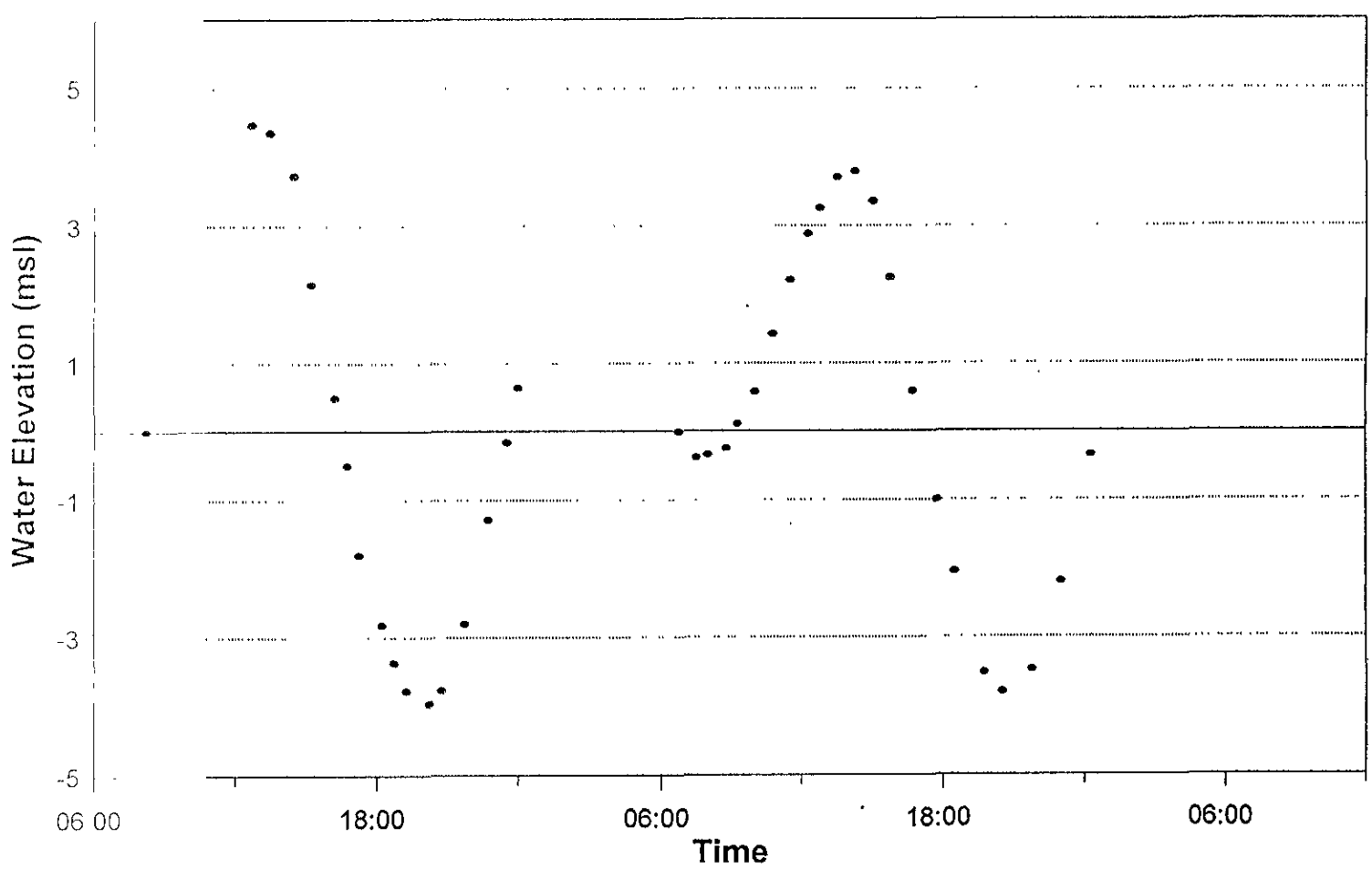
SIGNATURE: LT

APPENDIX D

TIDAL INFLUENCE STUDY DATA

Figure D1 - Alameda Harbor Hydrograph

December 5th and 6th, 1994



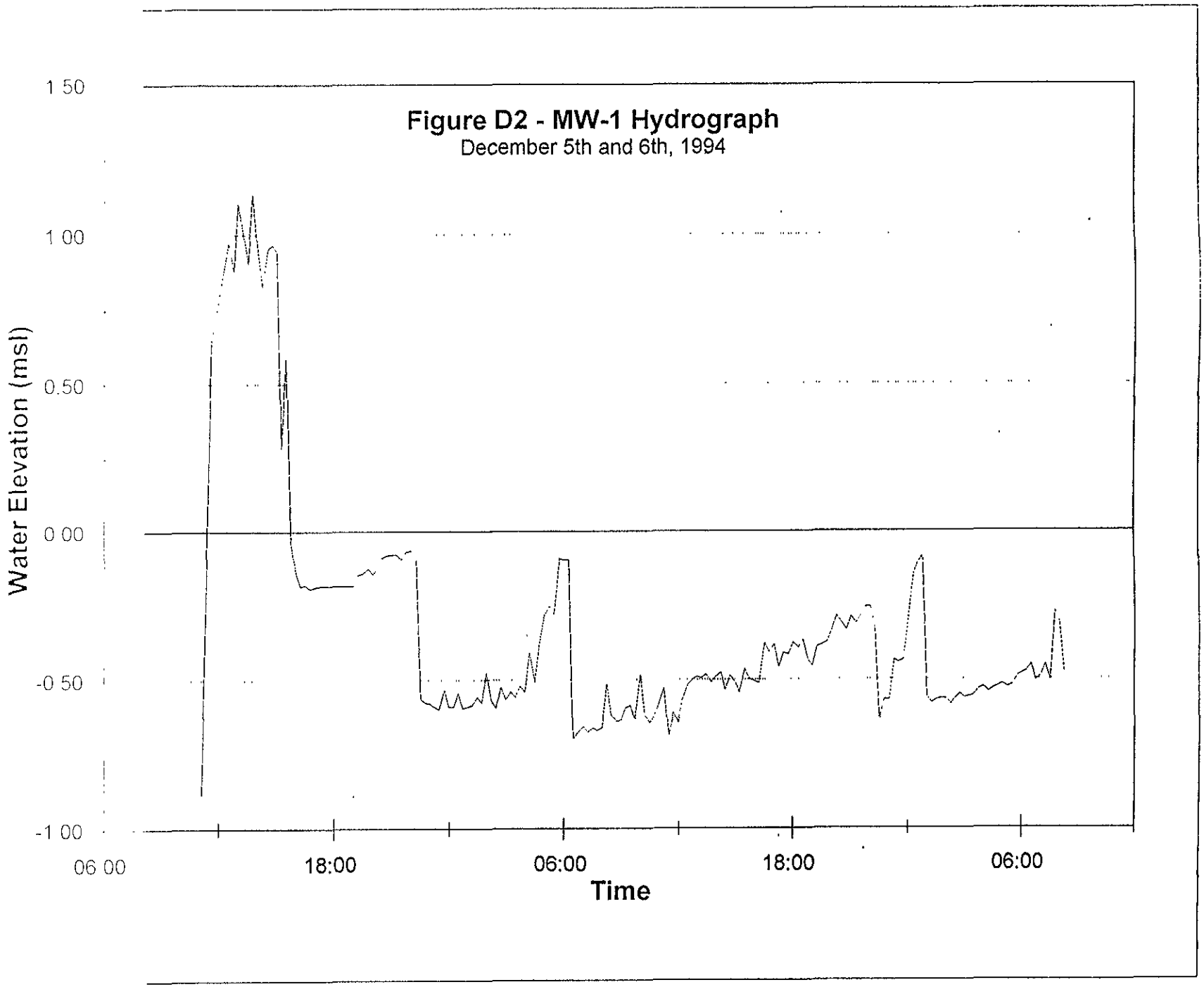


Figure D2 - MW-1 Hydrograph
December 5th and 6th, 1994
1 50
1 00
0.50
0 00
-0 50
-1 00
Water Elevation (msl)
06 00
18:00
06:00
18:00
06:00
Time

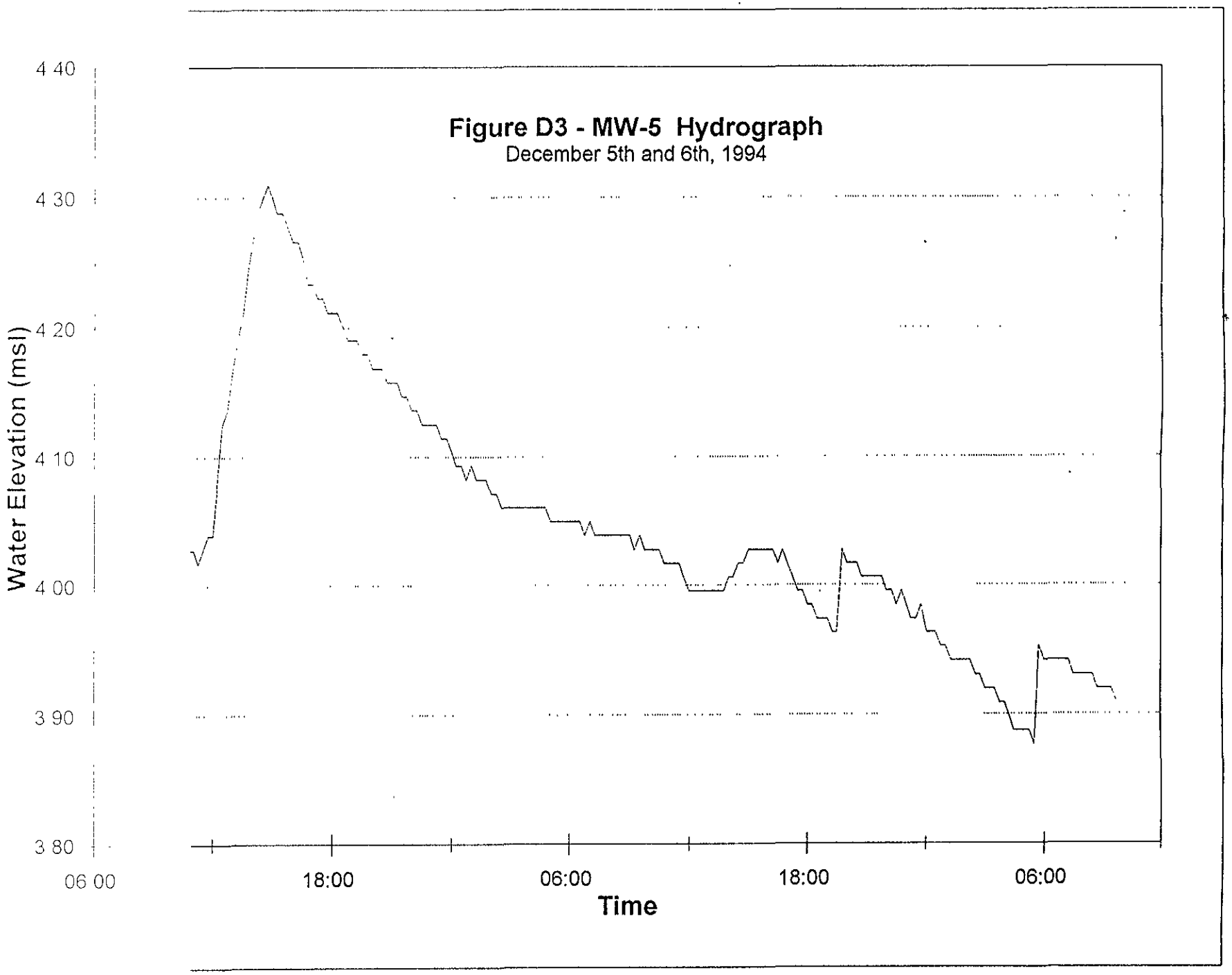


Figure D3 - MW-5 Hydrograph
December 5th and 6th, 1994
Water Elevation (msl)
4 40
4 30
4 20
4 10
4 00
3 90
3 80
06 00
18:00
06:00
18:00
06:00
Time

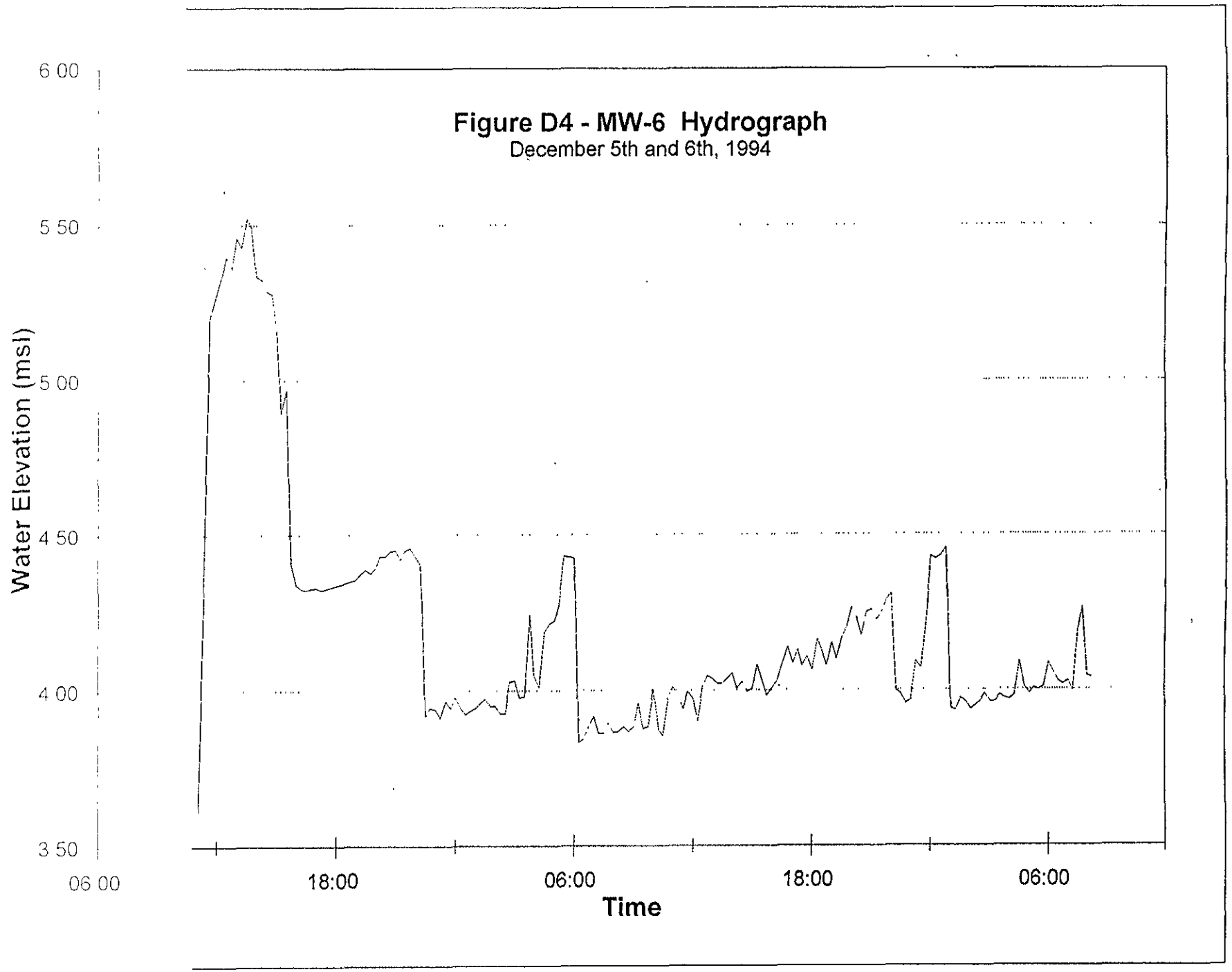


Figure D4 - MW-6 Hydrograph
December 5th and 6th, 1994
Water Elevation (msl)
6 00
5 50
5 00
4 50
4 00
3 50
06 00
18:00
06:00
18:00
06:00
Time

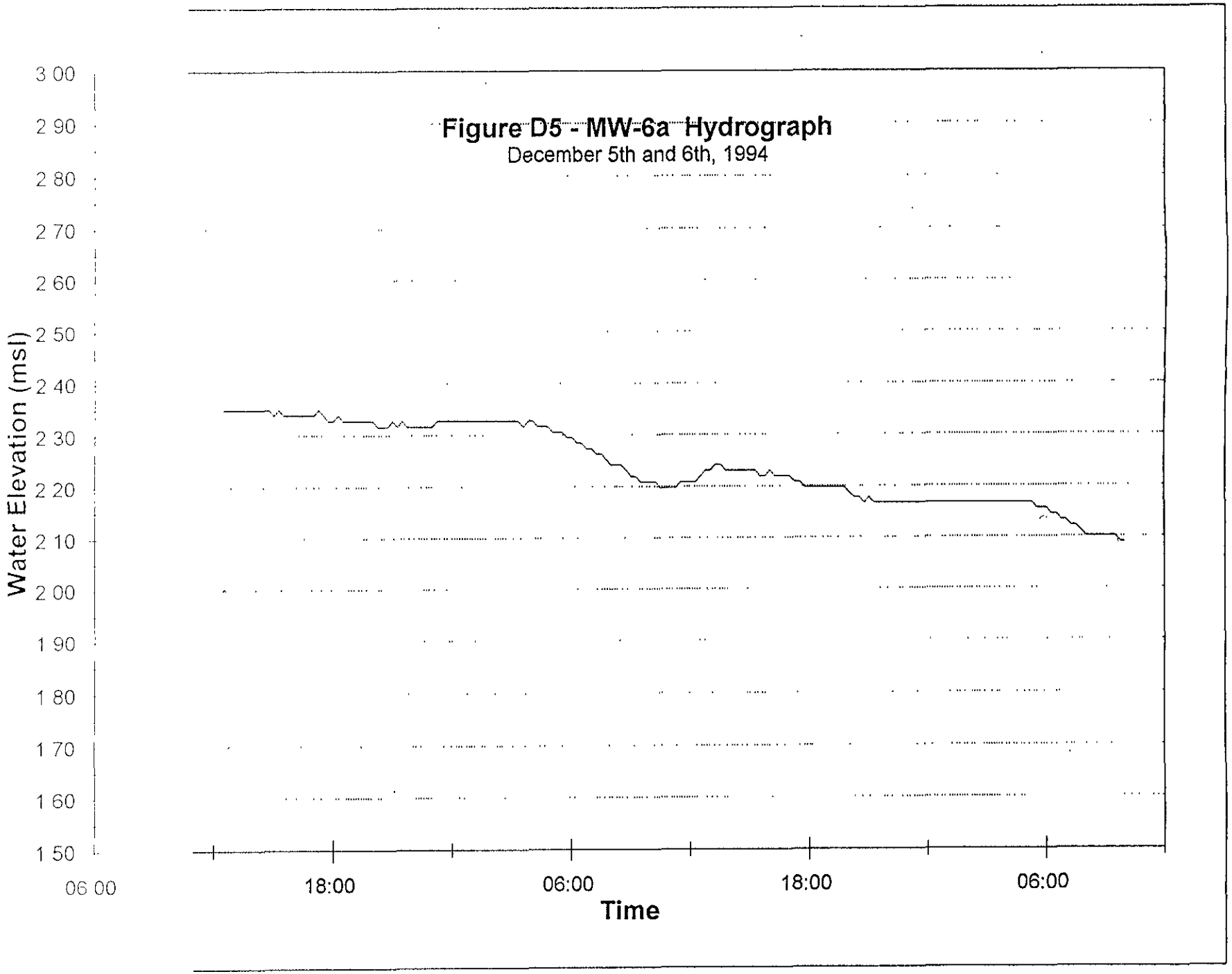


Figure D5 - MW-6a Hydrograph
December 5th and 6th, 1994
Water Elevation (msl)
3 00
2 90
2 80
2 70
2 60
2 50
2 40
2 30
2 20
2 10
2 00
1 90
1 80
1 70
1 60
1 50
06 00
18:00
06:00
18:00
06:00
Time

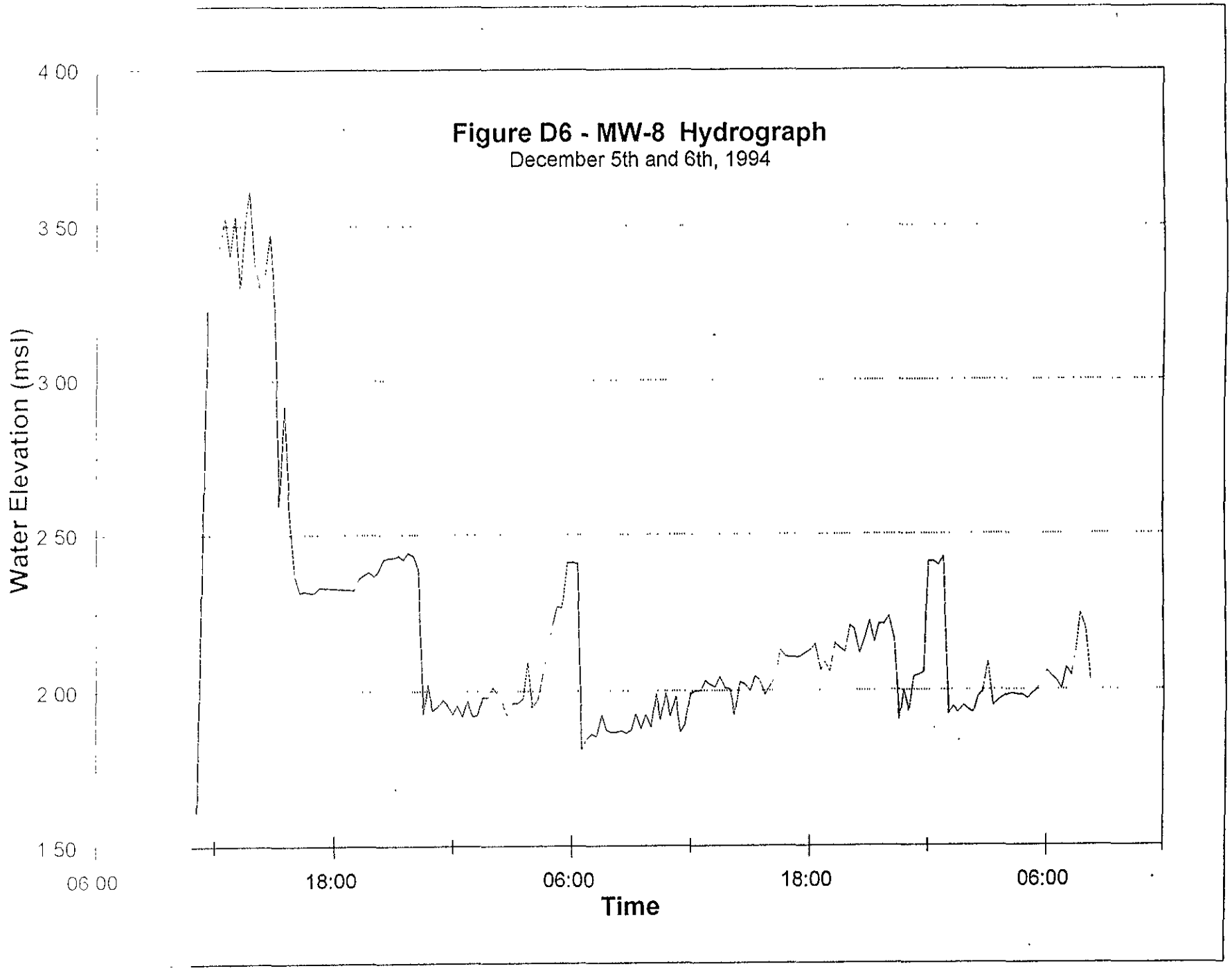


Figure D6 - MW-8 Hydrograph
December 5th and 6th, 1994
Water Elevation (msl)
4 00
3 50
3 00
2 50
2 00
1 50
06 00
18:00
06:00
18:00
06:00
Time

APPENDIX E

ANALYTICAL RESULTS
AND
CHAIN-OF-CUSTODY RECORDS

NATIONAL ENVIRONMENTAL TESTING, INC.

Santa Rosa Division
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Terri Plunkett-Kalmey
Seacor
90 New Montgomery
Suite 620
San Francisco, CA 94105

Date: 11/08/1994
NET Client Acct. No: 74000
NET Pacific Job No: 94.05128
Received: 10/28/1994

Client Reference Information

Crowley/Grand Marina, Project No. 50085-001-01

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Linda DeMartino
Project Coordinator

Jim Hoch
Operations Manager

Enclosure(s)

Ref: Crowley/Grand Marina, Project No. 50085-001-01

SAMPLE DESCRIPTION: MW5-2.5
Date Taken: 10/26/1994
Time Taken:
NET Sample No: 220769

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	160		50	mg/kg	5520C/E/F		11/02/1994	491
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/03/1994	1514
DILUTION FACTOR*	1						11/03/1994	1514
as Gasoline	ND		1	mg/kg	5030		11/03/1994	1514
METHOD 8020 (GC,Solid)	--						11/03/1994	1514
Benzene	ND		2.5	ug/kg	8020		11/03/1994	1514
Toluene	ND		2.5	ug/kg	8020		11/03/1994	1514
Ethylbenzene	ND		2.5	ug/kg	8020		11/03/1994	1514
Xylenes (Total)	ND		2.5	ug/kg	8020		11/03/1994	1514
SURROGATE RESULTS	--						11/03/1994	1514
Bromofluorobenzene (SURR)	74			% Rec.	5030		11/03/1994	1514
METHOD M8015 (EXT., Solid)						10/29/1994		
DILUTION FACTOR*	1						10/30/1994	888
as Diesel	23	DH	1	mg/kg	3550		10/30/1994	888

DH - The positive result appears to be a heavier hydrocarbon than Diesel.

Ref: Crowley/Grand Marina, Project No. 50085-001-01

SAMPLE DESCRIPTION: MWS-5
Date Taken: 10/26/1994
Time Taken:
NET Sample No: 220770

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	280		50	mg/kg	5520C/B/F		11/02/1994	491
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/03/1994	1514
DILUTION FACTOR*	1						11/03/1994	1514
as Gasoline	ND		1	mg/kg	5030		11/03/1994	1514
METHOD 8020 (GC,Solid)	--						11/03/1994	1514
Benzene	ND		2.5	ug/kg	8020		11/03/1994	1514
Toluene	ND		2.5	ug/kg	8020		11/03/1994	1514
Ethylbenzene	ND		2.5	ug/kg	8020		11/03/1994	1514
Xylenes (Total)	ND		2.5	ug/kg	8020		11/03/1994	1514
SURROGATE RESULTS	--						11/03/1994	1514
Bromofluorobenzene (SURR)	64	S2		% Rec.	5030		11/03/1994	1514
METHOD M8015 (EXT., Solid)						10/29/1994		
DILUTION FACTOR*	1						10/30/1994	888
as Diesel	27	DH	1	mg/kg	3550		10/30/1994	888

DH The positive result appears to be a heavier hydrocarbon than Diesel
S2 Analyzed twice with low surrogate recovery, possible matrix interference

Ref: Crowley/Grand Marina, Project No. 50085-001-01

SAMPLE DESCRIPTION: MWSA-6
Date Taken: 10/26/1994
Time Taken:
NET Sample No: 220771

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	ND		50	mg/kg	5520C/E/F		11/02/1994	491
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/02/1994	1513
DILUTION FACTOR*	1						11/02/1994	1513
as Gasoline	ND		1	mg/kg	5030		11/02/1994	1513
METHOD 8020 (GC,Solid)	--						11/02/1994	1513
Benzene	ND		2.5	ug/kg	8020		11/02/1994	1513
Toluene	ND		2.5	ug/kg	8020		11/02/1994	1513
Ethylbenzene	ND		2.5	ug/kg	8020		11/02/1994	1513
Xylenes (Total)	ND		2.5	ug/kg	8020		11/02/1994	1513
SURROGATE RESULTS	--						11/02/1994	1513
Bromofluorobenzene (SURR)	68	S2		% Rec.	5030		11/02/1994	1513
METHOD M8015 (EXT., Solid)						10/29/1994		
DILUTION FACTOR*	1						10/30/1994	888
as Diesel	ND		1	mg/kg	3550		10/30/1994	888

S2:Analyzed twice with low surrogate recovery, possible matrix interference

Ref: Crowley/Grand Marina, Project No. 50085-001-01

SAMPLE DESCRIPTION: MW6-2.5
Date Taken: 10/26/1994
Time Taken:
NET Sample No: 220772

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	930		50	mg/kg	5520C/E/F		11/02/1994	491
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/03/1994	1514
DILUTION FACTOR*	1						11/03/1994	1514
as Gasoline	ND		1	mg/kg	5030		11/03/1994	1514
METHOD 8020 (GC,Solid)	--						11/03/1994	1514
Benzene	ND		2.5	ug/kg	8020		11/03/1994	1514
Toluene	ND		2.5	ug/kg	8020		11/03/1994	1514
Ethylbenzene	ND		2.5	ug/kg	8020		11/03/1994	1514
Xylenes (Total)	ND		2.5	ug/kg	8020		11/03/1994	1514
SURROGATE RESULTS	--						11/03/1994	1514
Bromofluorobenzene (SURR)	1.1	S2		% Rec.	5030		11/03/1994	1514
METHOD M8015 (EXT., Solid)						10/29/1994		
DILUTION FACTOR*	2						10/30/1994	888
as Diesel	28	DH	2	mg/kg	3550		10/30/1994	888

DH The positive result appears to be a heavier hydrocarbon than Diesel.
S2 Analyzed twice with low surrogate recovery, possible matrix interference

Ref: Crowley/Grand Marina, Project No. 5008S-001-01

SAMPLE DESCRIPTION: MW7-2
Date Taken: 10/26/1994
Time Taken:
NET Sample No: 220773

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	180		50	mg/kg	5520C/E/F		11/02/1994	491
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/03/1994	1515
DILUTION FACTOR*	1						11/03/1994	1514
as Gasoline	ND		1	mg/kg	5030		11/03/1994	1514
METHOD 8020 (GC,Solid)	--						11/03/1994	1514
Benzene	ND		2.5	ug/kg	8020		11/03/1994	1514
Toluene	ND		2.5	ug/kg	8020		11/03/1994	1514
Ethylbenzene	ND		2.5	ug/kg	8020		11/03/1994	1514
Xylenes (Total)	15	C	2.5	ug/kg	8020		11/03/1994	1514
SURROGATE RESULTS	--						11/03/1994	1514
Bromofluorobenzene (SURR)	79			% Rec.	5030		11/03/1994	1514
METHOD M8015 (EXT., Solid)						10/29/1994		
DILUTION FACTOR*	2						10/30/1994	888
as Diesel	240	DH	2	mg/kg	3550		10/30/1994	888

C Positive result confirmed by secondary column or GC/MS analysis
DH The positive result appears to be a heavier hydrocarbon than Diesel

Ref: Crowley/Grand Marina, Project No. 50085-001-01

SAMPLE DESCRIPTION: MW8-3.5
Date Taken: 10/26/1994
Time Taken:
NET Sample No: 220774

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	390		50	mg/kg	5520C/E/F		11/02/1994	491
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/03/1994	1514
DILUTION FACTOR*	2						11/03/1994	1514
as Gasoline	20		2	mg/kg	5030		11/03/1994	1514
METHOD 8020 (GC,Solid)	--						11/03/1994	1514
Benzene	ND		5	ug/kg	8020		11/03/1994	1514
Toluene	5.7		5	ug/kg	8020		11/03/1994	1514
Ethylbenzene	10		5	ug/kg	8020		11/03/1994	1514
Xylenes (Total)	84		5	ug/kg	8020		11/03/1994	1514
SURROGATE RESULTS	--						11/03/1994	1514
Bromofluorobenzene (SURR)	73			% Rec.	5030		11/03/1994	1514
METHOD M8015 (EXT., Solid)						10/29/1994		
DILUTION FACTOR*	2						10/30/1994	888
as Diesel	97	D-	2	mg/kg	3550		10/30/1994	888

D- The positive result has an atypical pattern for Diesel analysis

Ref: Crowley/Grand Marina, Project No. 50085-001-01

CONTINUING CALIBRATION VERIFICATION STANDARD REPORT

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Solid)						
as Gasoline	86.6	4.33	5.00	mg/kg	11/02/1994	aal
Benzene	95.2	23.8	25.0	ug/kg	11/02/1994	aal
Toluene	92.8	23.2	25.0	ug/kg	11/02/1994	aal
Ethylbenzene	98.4	24.6	25.0	ug/kg	11/02/1994	aal
Xylenes (Total)	94.1	70.6	75.0	ug/kg	11/02/1994	aal
Bromofluorobenzene (SURR)	88.0	88	100	% Rec.	11/02/1994	aal
TPH (Gas/BTXE,Solid)						
as Gasoline	85.6	4.28	5.00	mg/kg	11/03/1994	aal
Benzene	99.6	24.9	25.0	ug/kg	11/03/1994	aal
Toluene	105.2	26.3	25.0	ug/kg	11/03/1994	aal
Ethylbenzene	101.2	25.3	25.0	ug/kg	11/03/1994	aal
Xylenes (Total)	100.1	75.1	75.0	ug/kg	11/03/1994	aal
Bromofluorobenzene (SURR)	90.0	90	100	% Rec.	11/03/1994	aal
TPH (Gas/BTXE,Solid)						
as Gasoline	112.6	5.63	5.00	mg/kg	11/04/1994	pbg
Benzene	98.4	24.6	25.0	ug/kg	11/04/1994	pbg
Toluene	95.6	23.9	25.0	ug/kg	11/04/1994	pbg
Ethylbenzene	102.4	25.6	25.0	ug/kg	11/04/1994	pbg
Xylenes (Total)	96.5	72.4	75.0	ug/kg	11/04/1994	pbg
Bromofluorobenzene (SURR)	87.4	87.4	100	% Rec.	11/04/1994	pbg
METHOD M8015 (EXT., Solid)						
as Diesel	90.9	909	1000	mg/kg	10/30/1994	tts

Ref: Crowley/Grand Marina, Project No. 50085-001-01

METHOD BLANK REPORT

Parameter	Method Blank Amount Found	Reporting Limit	Units	Date Analyzed	Analyst Initials
Oil & Grease (IR,TRPH)	ND	50	mg/kg	11/02/1994	shr
TPH (Gas/BTXE,Solid)					
as Gasoline	ND	1	mg/kg	11/02/1994	aal
Benzene	ND	2.5	ug/kg	11/02/1994	aal
Toluene	ND	2.5	ug/kg	11/02/1994	aal
Ethylbenzene	ND	2.5	ug/kg	11/02/1994	aal
Xylenes (Total)	ND	2.5	ug/kg	11/02/1994	aal
Bromofluorobenzene (SURR)	94		% Rec.	11/02/1994	aal
TPH (Gas/BTXE,Solid)					
as Gasoline	ND	1	mg/kg	11/03/1994	aal
Benzene	ND	2.5	ug/kg	11/03/1994	aal
Toluene	ND	2.5	ug/kg	11/03/1994	aal
Ethylbenzene	ND	2.5	ug/kg	11/03/1994	aal
Xylenes (Total)	ND	2.5	ug/kg	11/03/1994	aal
Bromofluorobenzene (SURR)	90		% Rec.	11/03/1994	aal
TPH (Gas/BTXE,Solid)					
as Gasoline	ND	1	mg/kg	11/04/1994	pbg
Benzene	ND	2.5	ug/kg	11/04/1994	pbg
Toluene	ND	2.5	ug/kg	11/04/1994	pbg
Ethylbenzene	ND	2.5	ug/kg	11/04/1994	pbg
Xylenes (Total)	ND	2.5	ug/kg	11/04/1994	pbg
Bromofluorobenzene (SURR)	85		% Rec.	11/04/1994	pbg
METHOD M8015 (EXT., Solid)					
as Diesel	ND	1	mg/kg	10/30/1994	tts

Ref: Crowley/Grand Marina, Project No. 50085-001-01

MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Parameter	Matrix Spike % Rec.	Matrix Spike Dup % Rec.	RPD	Spike Amount	Sample Conc.	Matrix Spike Conc.	Matrix Spike Dup. Conc.	Units	Date Analyzed	Analyst Initials
Oil & Grease (IR,TRPH)	102.8	96.3	6.4	320	18	347	329	mg/kg	11/02/1994	shr
TPH (Gas/BTXE,Solid)										
as Gasoline	71.6	70.4	1.7	5.57	ND	3.99	3.92	mg/kg dw	11/02/1994	aal
Benzene	84.8	82.1	3.2	162	ND	137	133	ug/kg dw	11/02/1994	aal
Toluene	92.9	91.8	1.2	407	ND	378	373	ug/kg dw	11/02/1994	aal
TPH (Gas/BTXE,Solid)										
as Gasoline	80.0	87.8	9.3	5.00	ND	4.00	4.39	mg/kg	11/03/1994	aal
Benzene	97.8	98.6	0.8	139	ND	136	137	ug/kg	11/03/1994	aal
Toluene	94.1	97.6	3.7	424	ND	399	414	ug/kg	11/03/1994	aal
METHOD M8015 (EXT., Solid)										
as Diesel	83.2	83.2	0.0	19.7	ND	16.4	16.4	mg/kg dw	10/30/1994	tts

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05128

Date: 11/08/1994
ELAP Cert: 1386
Page: 11

Ref: Crowley/Grand Marina, Project No. 50085-001-01

LABORATORY CONTROL SAMPLE REPORT

Parameter	LCS % Recovery	RPD	LCS Amount Found	LCS Amount Expected	Units	Date Analyzed	Analyst Initials
Oil & Grease (IR,TRPH)	101.3		324	320	mg/kg	11/02/1994	shr
METHOD M8015 (EXT., Solid) as Diesel	89.2		14.9	16.7	mg/kg	10/30/1994	tts

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. Actual reporting limits and results have been multiplied by the listed dilution factor. Do not multiply the reporting limits or reported values by the dilution factor.
dw	:	Result expressed as dry weight.
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than the applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, Rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, Rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986., Rev. 1, December 1987.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

Revised September, 1993
abb.93

NATIONAL ENVIRONMENTAL® TESTING, INC.

Santa Rosa Division
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Terri Plunkett-Kalmey
Seacor
90 New Montgomery
Suite 620
San Francisco, CA 94105

Date: 11/08/1994
NET Client Acct. No: 74000
NET Pacific Job No: 94.05127
Received: 10/28/1994

Client Reference Information

Crowley/Grand Marina, Project No. 50085-001-01

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Linda DeMartino
Project Coordinator

Jim Hoch
Operations Manager

Enclosure(s)

Ref: Crowley/Grand Marina, Project No. 5008S-001-01

SAMPLE DESCRIPTION: TP3A-2
Date Taken: 10/27/1994
Time Taken:
NET Sample No: 220758

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	6,900		50	mg/kg	5520C/E/F		11/02/1994	491
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/02/1994	1513
DILUTION FACTOR*	1						11/02/1994	1513
as Gasoline	ND		1	mg/kg	5030		11/02/1994	1513
METHOD 8020 (GC,Solid)	--						11/02/1994	1513
Benzene	ND		2.5	ug/kg	8020		11/02/1994	1513
Toluene	ND		2.5	ug/kg	8020		11/02/1994	1513
Ethylbenzene	ND		2.5	ug/kg	8020		11/02/1994	1513
Xylenes (Total)	ND		2.5	ug/kg	8020		11/02/1994	1513
SURROGATE RESULTS	--						11/02/1994	1513
Bromofluorobenzene (SURR)	41	S2		% Rec.	5030		11/02/1994	1513
METHOD M8015 (EXT., Solid)						10/29/1994		
DILUTION FACTOR*	50						10/30/1994	888
as Diesel	1,400	DH	50	mg/kg	3550		10/30/1994	888

DH The positive result appears to be a heavier hydrocarbon than Diesel
S2 Analyzed twice with low surrogate recovery, possible matrix interference

Ref: Crowley/Grand Marina, Project No. 50085-001-01

CONTINUING CALIBRATION VERIFICATION STANDARD REPORT

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Solid)						
as Gasoline	86.6	4.33	5.00	mg/kg	11/02/1994	aal
Benzene	95.2	23.8	25.0	ug/kg	11/02/1994	aal
Toluene	92.8	23.2	25.0	ug/kg	11/02/1994	aal
Ethylbenzene	98.4	24.6	25.0	ug/kg	11/02/1994	aal
Xylenes (Total)	94.1	70.6	75.0	ug/kg	11/02/1994	aal
Bromofluorobenzene (SURR)	88.0	88	100	% Rec.	11/02/1994	aal
METHOD M8015 (EXT., Solid)						
as Diesel	90.9	909	1000	mg/kg	10/30/1994	tts

Ref: Crowley/Grand Marina, Project No. 50085-001-01

METHOD BLANK REPORT

Parameter	Method Blank Amount Found	Reporting Limit	Units	Date Analyzed	Analyst Initials
Oil & Grease (IR,TRPH)	ND	50	mg/kg	11/02/1994	shr
TPH (Gas/BTXE,Solid)					
as Gasoline	ND	1	mg/kg	11/02/1994	aal
Benzene	ND	2.5	ug/kg	11/02/1994	aal
Toluene	ND	2.5	ug/kg	11/02/1994	aal
Ethylbenzene	ND	2.5	ug/kg	11/02/1994	aal
Xylenes (Total)	ND	2.5	ug/kg	11/02/1994	aal
Bromofluorobenzene (SURR)	94		% Rec.	11/02/1994	aal
METHOD M8015 (EXT., Solid)					
as Diesel	ND	1	mg/kg	10/30/1994	tts

Ref: Crowley/Grand Marina, Project No. 50085-001-01

MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Parameter	Matrix Spike % Rec.	Matrix Spike Dup % Rec.	RPD	Spike Amount	Sample Conc.	Matrix Spike Conc.	Matrix Spike Dup. Conc.	Units	Date Analyzed	Analyst Initials
Oil & Grease (IR,TRPH)	102.8	96.3	6.4	320	18	347	329	mg/kg	11/02/1994	shr
TPH (Gas/BTXE,Solid)										
as Gasoline	71.6	70.4	1.7	5.57	ND	3.99	3.92	mg/kg dw	11/02/1994	aal
Benzene	84.8	82.1	3.2	162	ND	137	133	ug/kg dw	11/02/1994	aal
Toluene	92.9	91.8	1.2	407	ND	378	373	ug/kg dw	11/02/1994	aal
METHOD M8015 (EXT., Solid)										
as Diesel	83.2	83.2	0.0	19.7	ND	16.4	16.4	mg/kg dw	10/30/1994	tts

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05127

Date: 11/08/1994
ELAP Cert: 1386
Page: 6

Ref: Crowley/Grand Marina, Project No. 50085-001-01

LABORATORY CONTROL SAMPLE REPORT

Parameter	LCS % Recovery	RPD	LCS Amount Found	LCS Amount Expected	Units	Date Analyzed	Analyst Initials
Oil & Grease.(IR,TRPH)	101.3		324	320	mg/kg	11/02/1994	shr
METHOD M8015 (EXT., Solid) as Diesel	89.2		14.9	16.7	mg/kg	10/30/1994	tts

NET®

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. Actual reporting limits and results have been multiplied by the listed dilution factor. Do not multiply the reporting limits or reported values by the dilution factor.
dw	:	Result expressed as dry weight.
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than the applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, Rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, Rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986., Rev. 1, December 1987.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

Revised September, 1993
abb.93

NATIONAL ENVIRONMENTAL TESTING, INC.

Santa Rosa Division
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Terri Plunkett
Seacor
90 New Montgomery
Suite 620
San Francisco, CA 94105

Date: 11/15/1994
NET Client Acct. No: 74000
NET Pacific Job No: 94.05235
Received: 11/02/1994

Client Reference Information

Crowley GM, Job Name:50085-001-01

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Linda DeMartino
Project Coordinator

Jim Hoch
Operations Manager

Enclosure(s)

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05235

Date: 11/15/1994
ELAP Cert: 1386

Ref: Crowley GM, Job Name:50085-001-01

SAMPLE DESCRIPTION: MW-1
Date Taken: 10/31/1994
Time Taken: 19:20
NET Sample No: 221385

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
METHOD 5030/M8015	--						11/10/1994	2287
DILUTION FACTOR*	1						11/10/1994	2287
as Gasoline	0.08		0.05	mg/L	5030		11/10/1994	2287
METHOD 8020 (GC,Liquid)	--						11/10/1994	2287
Benzene	ND		0.5	ug/L	8020		11/10/1994	2287
Toluene	1.1		0.5	ug/L	8020		11/10/1994	2287
Ethylbenzene	ND		0.5	ug/L	8020		11/10/1994	2287
Xylenes (Total)	1.4		0.5	ug/L	8020		11/10/1994	2287
SURROGATE RESULTS	--						11/10/1994	2287
Bromofluorobenzene (SURR)	117			% Rec.	5030		11/10/1994	2287
METHOD M8015 (EXT., Liquid)						11/07/1994		
DILUTION FACTOR*	1						11/08/1994	839
as Diesel	0.40	DH	0.05	mg/L	3510		11/08/1994	839

DH : The positive result appears to be a heavier hydrocarbon than Diesel

Ref: Crowley GM, Job Name:S0085-001-01

SAMPLE DESCRIPTION: MW-2
Date Taken: 10/31/1994
Time Taken: 18:15
NET Sample No: 221386

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
METHOD 5030/M8015	--						11/10/1994	2287
DILUTION FACTOR*	100						11/10/1994	2287
as Gasoline	22		5	mg/L	5030		11/10/1994	2287
METHOD 8020 (GC,Liquid)	--						11/10/1994	2287
Benzene	2,200		50	ug/L	8020		11/10/1994	2287
Toluene	4,800		50	ug/L	8020		11/10/1994	2287
Ethylbenzene	500		50	ug/L	8020		11/10/1994	2287
Xylenes (Total)	2,700		50	ug/L	8020		11/10/1994	2287
SURROGATE RESULTS	--						11/10/1994	2287
Bromofluorobenzene (SURR)	120			% Rec.	5030		11/10/1994	2287
METHOD M8015 (EXT., Liquid)						11/07/1994		
DILUTION FACTOR*	2						11/08/1994	839
as Diesel	4.2	DL	0.1	mg/L	3510		11/08/1994	839

DL . The positive result appears to be a lighter hydrocarbon than Diesel.

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05235

Date: 11/15/1994
ELAP Cert: 1386
Page: 4

Ref: Crowley GM, Job Name:50085-001-01

SAMPLE DESCRIPTION: MW-3
Date Taken: 10/31/1994
Time Taken: 17:55
NET Sample No: 221387

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
METHOD 5030/M8015	--						11/10/1994	2287
DILUTION FACTOR*	1						11/10/1994	2287
as Gasoline	0.11		0.05	mg/L	5030		11/10/1994	2287
METHOD 8020 (GC,Liquid)	--						11/10/1994	2287
Benzene	ND		0.5	ug/L	8020		11/10/1994	2287
Toluene	ND		0.5	ug/L	8020		11/10/1994	2287
Ethylbenzene	2.4		0.5	ug/L	8020		11/10/1994	2287
Xylenes (Total)	5.2		0.5	ug/L	8020		11/10/1994	2287
SURROGATE RESULTS	--						11/10/1994	2287
Bromofluorobenzene (SURR)	119			% Rec.	5030		11/10/1994	2287
METHOD M8015 (EXT., Liquid)						11/07/1994		
DILUTION FACTOR*	1						11/08/1994	839
as Diesel	0.14	DH	0.05	mg/L	3510		11/08/1994	839

DH : The positive result appears to be a heavier hydrocarbon than Diesel

Ref: Crowley GM, Job Name:50085-001-01

SAMPLE DESCRIPTION: MW-6
Date Taken: 10/31/1994
Time Taken: 17:40
NET Sample No: 221390

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
METHOD 5030/M8015	--						11/10/1994	2287
DILUTION FACTOR*	1						11/10/1994	2287
as Gasoline	ND		0.05	mg/L	5030		11/10/1994	2287
METHOD 8020 (GC,Liquid)	--						11/10/1994	2287
Benzene	ND		0.5	ug/L	8020		11/10/1994	2287
Toluene	ND		0.5	ug/L	8020		11/10/1994	2287
Ethylbenzene	ND		0.5	ug/L	8020		11/10/1994	2287
Xylenes (Total)	ND		0.5	ug/L	8020		11/10/1994	2287
SURROGATE RESULTS	--						11/10/1994	2287
Bromofluorobenzene (SURR)	109			% Rec.	5030		11/10/1994	2287

Ref: Crowley GM, Job Name:50085-001-01

SAMPLE DESCRIPTION: MW-7
Date Taken: 10/31/1994
Time Taken: 19:05
NET Sample No: 221391

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
METHOD 5030/M8015	--						11/10/1994	2285
DILUTION FACTOR*	1						11/10/1994	2285
as Gasoline	ND		0.05	mg/L	5030		11/10/1994	2285
METHOD 8020 (GC,Liquid)	--						11/10/1994	2285
Benzene	ND		0.5	ug/L	8020		11/10/1994	2285
Toluene	ND		0.5	ug/L	8020		11/10/1994	2285
Ethylbenzene	ND		0.5	ug/L	8020		11/10/1994	2285
Xylenes (Total)	ND		0.5	ug/L	8020		11/10/1994	2285
SURROGATE RESULTS	--						11/10/1994	2285
Bromofluorobenzene (SURR)	99			% Rec.	5030		11/10/1994	2285
METHOD M8015 (EXT., Liquid)						11/07/1994		
DILUTION FACTOR*	1						11/08/1994	839
as Diesel	0.97	DH	0.05	mg/L	3510		11/08/1994	839

DH : The positive result appears to be a heavier hydrocarbon than Diesel

Ref: Crpwley GM, Job Name:50085-001-01

SAMPLE DESCRIPTION: MW-8
Date Taken: 10/31/1994
Time Taken: 18:50
NET Sample No: 221392

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Liquid)								
METHOD 5030/M8015	--						11/12/1994	2290
DILUTION FACTOR*	1						11/10/1994	2285
as Gasoline	ND		0.05	mg/L	5030		11/10/1994	2285
METHOD 8020 (GC,Liquid)	--						11/10/1994	2285
Benzene	ND		0.5	ug/L	8020		11/10/1994	2285
Toluene	ND		0.5	ug/L	8020		11/10/1994	2285
Ethylbenzene	ND		0.5	ug/L	8020		11/10/1994	2285
Xylenes (Total)	ND		0.5	ug/L	8020		11/10/1994	2285
SURROGATE RESULTS	--						11/10/1994	2285
Bromofluorobenzene (SURR)	106			% Rec.	5030		11/10/1994	2285
METHOD M8015 (EXT., Liquid)						11/07/1994		
DILUTION FACTOR*	1						11/08/1994	839
as Diesel	1.0	DH	0.05	mg/L	3510		11/08/1994	839

DH The positive result appears to be a heavier hydrocarbon than Diesel.

Ref: Crowley GM, Job Name:50085-001-01

CONTINUING CALIBRATION VERIFICATION STANDARD REPORT

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Liquid)						
as Gasoline	101.0	1.01	1.00	mg/L	11/10/1994	aal
Benzene	91.2	4.56	5.00	ug/L	11/10/1994	aal
Toluene	95.4	4.77	5.00	ug/L	11/10/1994	aal
Ethylbenzene	90.6	4.53	5.00	ug/L	11/10/1994	aal
Xylenes (Total)	95.3	14.3	15.0	ug/L	11/10/1994	aal
Bromofluorobenzene (SURR)	103.0	103	100	% Rec.	11/10/1994	aal
TPH (Gas/BTXE,Liquid)						
as Gasoline	104.0	1.04	1.00	mg/L	11/10/1994	aal
Benzene	114.6	5.73	5.00	ug/L	11/10/1994	aal
Toluene	109.0	5.45	5.00	ug/L	11/10/1994	aal
Ethylbenzene	111.6	5.58	5.00	ug/L	11/10/1994	aal
Xylenes (Total)	112.7	16.9	15.0	ug/L	11/10/1994	aal
Bromofluorobenzene (SURR)	97.0	97	100	% Rec.	11/10/1994	aal
TPH (Gas/BTXE,Liquid)						
as Gasoline	104.0	1.04	1.00	mg/L	11/12/1994	tts
Benzene	99.0	4.95	5.00	ug/L	11/12/1994	tts
Toluene	93.6	4.68	5.00	ug/L	11/12/1994	tts
Ethylbenzene	100.6	5.03	5.00	ug/L	11/12/1994	tts
Xylenes (Total)	99.3	14.9	15.0	ug/L	11/12/1994	tts
Bromofluorobenzene (SURR)	91.0	91	100	% Rec.	11/12/1994	tts
METHOD M8015 (EXT., Liquid)						
as Diesel	94.3	943	1000	mg/L	11/08/1994	tts

Ref: Crowley GM, Job Name:50085-001-01

METHOD BLANK REPORT

Parameter	Method Blank Amount Found	Reporting Limit	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Liquid)					
as Gasoline	ND	0.05	mg/L	11/10/1994	aal
Benzene	ND	0.5	ug/L	11/10/1994	aal
Toluene	ND	0.5	ug/L	11/10/1994	aal
Ethylbenzene	ND	0.5	ug/L	11/10/1994	aal
Xylenes (Total)	ND	0.5	ug/L	11/10/1994	aal
Bromofluorobenzene (SURR)	93		% Rec.	11/10/1994	aal
TPH (Gas/BTXE,Liquid)					
as Gasoline	ND	0.05	mg/L	11/10/1994	aal
Benzene	ND	0.5	ug/L	11/10/1994	aal
Toluene	ND	0.5	ug/L	11/10/1994	aal
Ethylbenzene	ND	0.5	ug/L	11/10/1994	aal
Xylenes (Total)	ND	0.5	ug/L	11/10/1994	aal
Bromofluorobenzene (SURR)	111		% Rec.	11/10/1994	aal
TPH (Gas/BTXE,Liquid)					
as Gasoline	ND	0.05	mg/L	11/12/1994	tts
Benzene	ND	0.5	ug/L	11/12/1994	tts
Toluene	ND	0.5	ug/L	11/12/1994	tts
Ethylbenzene	ND	0.5	ug/L	11/12/1994	tts
Xylenes (Total)	ND	0.5	ug/L	11/12/1994	tts
Bromofluorobenzene (SURR)	106		% Rec.	11/12/1994	tts
METHOD M8015 (EXT., Liquid)					
as Diesel	ND	0.05	mg/L	11/08/1994	tts

Ref: Crowley GM, Job Name:50085-001-01

MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Parameter	Matrix Spike % Rec.	Matrix Spike Dup % Rec.	RPD	Spike Amount	Sample Conc.	Matrix Spike Conc.	Matrix Spike Dup. Conc.	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Liquid)										
as Gasoline	105.0	100.0	4.9	1.00	ND	1.05	1.00	mg/L	11/10/1994	aal
Benzene	107.8	101.2	6.3	25.7	ND	27.7	26.0	ug/L	11/10/1994	aal
Toluene	106.3	100.1	6.0	85.7	ND	91.1	85.8	ug/L	11/10/1994	aal
TPH (Gas/BTXE,Liquid)										
as Gasoline	108.0	112.0	3.6	1.00	ND	1.08	1.12	mg/L	11/10/1994	aal
Benzene	102.7	100.0	2.7	18.5	ND	19.0	18.5	ug/L	11/10/1994	aal
Toluene	103.5	104.3	0.8	75.2	ND	77.8	78.4	ug/L	11/10/1994	aal
TPH (Gas/BTXE,Liquid)										
as Gasoline	97.0	98.0	1.0	1.00	ND	0.97	0.98	mg/L	11/12/1994	tts
Benzene	91.7	92.7	1.1	20.5	ND	18.8	19.0	ug/L	11/12/1994	tts
Toluene	92.9	93.8	1.0	84.4	ND	78.4	79.2	ug/L	11/12/1994	tts
METHOD M8015 (EXT., Liquid)										
as Diesel	99.5	92.5	7.3	2.00	ND	1.99	1.85	mg/L	11/08/1994	tts

Ref: Crowley GM, Job Name:50085-001-01

LABORATORY CONTROL SAMPLE REPORT

Parameter	LCS % Recovery	RPD	LCS Amount Found	LCS Amount Expected	Units	Date Analyzed	Analyst Initials
METHOD M8015 (EXT., Liquid)							
as Diesel	64.8		0.648	1.00	mg/L	11/08/1994	tts

NET® KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	Reporting Limits are a function of the dilution factor for any given sample. Actual reporting limits and results have been multiplied by the listed dilution factor. Do not multiply the reporting limits or reported values by the dilution factor.
dw	:	Result expressed as dry weight.
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than the applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, Rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, Rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986., Rev. 1, December 1987.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

Revised September, 1993
abb.93

NATIONAL ENVIRONMENTAL® TESTING, INC.

Santa Rosa Division
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Terri Plunkett
Seacor
90 New Montgomery
Suite 620
San Francisco, CA 94105

Date: 11/16/1994
NET Client Acct. No: 74000
NET Pacific Job No.: 94.05276
Received: 11/05/1994

Client Reference Information

Crowley GM/50085-001-01

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Linda DeMartino
Project Coordinator

Jim Hoch
Operations Manager

Enclosure(s)

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05276

Date: 11/16/1994
ELAP Cert: 1386
Page: 2

Ref: Crowley GM/50085-001-01

SAMPLE DESCRIPTION: MW-1
Date Taken: 11/04/1994
Time Taken:
NET Sample No: 221644

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	ND		5	mg/L	5520C/F		11/15/1994	256

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05276

Date: 11/16/1994
ELAP Cert: 1386
Page: 3

Ref: Crowley GM/50085-001-01

SAMPLE DESCRIPTION: MW-2
Date Taken: 11/04/1994
Time Taken:
NET Sample No: 221645

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	13		5	mg/L	5520C/F		11/15/1994	256

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05276

Date: 11/16/1994
ELAP Cert: 1386
Page: 4

Ref: Crowley GM/50085-001-01

SAMPLE DESCRIPTION: MW-3
Date Taken: 11/04/1994
Time Taken:
NET Sample No: 221646

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	ND		5	mg/L	5520C/F		11/15/1994	256

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05276

Date: 11/16/1994
ELAP Cert: 1386
Page: 5

Ref: Crowley GM/50085-001-01

SAMPLE DESCRIPTION: MW-4
Date Taken: 11/04/1994
Time Taken:
NET Sample No: 221647

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	ND		5	mg/L	5520C/F		11/15/1994	256

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05276

Date: 11/16/1994
ELAP Cert: 1386
Page: 6

Ref: Crowley GM/50085-001-01

SAMPLE DESCRIPTION: MW-5
Date Taken: 11/04/1994
Time Taken:
NET Sample No: 221648

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	ND		5	mg/L	5520C/F		11/15/1994	256

Ref: Crowley GM/50085-001-01

SAMPLE DESCRIPTION: MW-6
Date Taken: 11/04/1994
Time Taken:
NET Sample No: 221649

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	ND		5	mg/L	5520C/F		11/15/1994	256
METHOD M8015 (EXT., Liquid)						11/08/1994		
DILUTION FACTOR*	1						11/10/1994	841
as Diesel	0.50	DH	0.05	mg/L	3510		11/10/1994	841

DH - The positive result appears to be a heavier hydrocarbon than Diesel.

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05276

Date: 11/16/1994
ELAP Cert: 1386
Page: 8

Ref: Crowley GM/S0085-001-01

SAMPLE DESCRIPTION: MW-7
Date Taken: 11/04/1994
Time Taken:
NET Sample No: 221650

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	ND		5	mg/L	5520C/F		11/15/1994	256

Client Name: Seacor
Client Acct: 74000
NET Job No: 94.05276

Date: 11/16/1994
ELAP Cert: 1386
Page: 9

Ref: Crowley GM/50085-001-01

SAMPLE DESCRIPTION: MW-8
Date Taken: 11/04/1994
Time Taken:
NET Sample No: 221651

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Oil & Grease (IR,TRPH)	ND		5	mg/L	5520C/F		11/15/1994	256

Ref: Crowley GM/50085-001-01

CONTINUING CALIBRATION VERIFICATION STANDARD REPORT

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Units	Date Analyzed	Analyst Initials
Oil & Grease (IR,TRPH)	101.3	162	160	mg/L	11/15/1994	shr
METHOD M8015 (EXT., Liquid) as Diesel	102.0	1020	1000	mg/L	11/10/1994	tdn

Ref: Crowley GM/5008S-001-01

METHOD BLANK REPORT

Parameter	Method Blank Amount Found	Reporting Limit	Units	Date Analyzed	Analyst Initials
Oil & Grease (IR,TRPH)	ND	5	mg/L	11/15/1994	shr
METHOD M8015 (EXT., Liquid) as Diesel	ND	0.05	mg/L	11/10/1994	tdn